MONTHLY WEATHER REVIEW.

(GENERAL WEATHER SERVICE OF THE UNITED STATES.)

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WAR DEPARTMENT,

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DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

This REVIEW presents a general summary of the meteorological data collected by the Signal Service during the month of September, 1882.

A special feature of the meteorology of the month has been the tropical hurricane charted as low area ii. It is remarkable for the violence of the winds near its centre, and for the great loss of property on land and sea. This cyclone presents the not unusual features of tropical hurricanes which have crossed land; on two occasions there were observed in the vortex of the storm, tired land birds of many varieties imprisoned and unable, on account of the violence of the winds, to escape. These birds therefore must have been on the wing at least the three days that it took the cyclone to travel from Cuba to the Gulf states.

The other marked features of the month have been:

1st: The excessive rains which fell along the New England and middle Atlantic coasts in connection with low area iv. These heavy rains resulted in very destructive freshets in the rivers and smaller streams, and caused the large excess over the mean rainfall in New England and the middle Atlantic states.

2d: The very hot and dry winds which prevailed over Kansas and Missouri on the 12th, 13th, and 14th. The temperatures recorded during the prevalence of these winds were, at many places, the highest ever observed in September, and are specially noted in the REVIEW under the heading "high temperatures."

That part of the REVIEW referring to International Meteorology presents the general weather conditions which prevailed over the northern hemisphere during the month of July, 1880. The prominent characteristics of that month was the prevalence of barometric maxima over the Atlantic ocean, and the absence of storms in that region. In Europe, hail-storms were of unusual frequency and severity during the month. Chart v. exhibits the paths of barometric minima for October, 1880, and will be found interesting as showing the tracks of the two disastrous storms that swept over Europe during the month. A noteworthy feature of the chart is the unusually large number of barometric minima, shown over northern Europe. On this chart are also exhibited the tracks of three typhoons that occurred over the China sea during the month.

In the preparation of this REVIEW, the following data received up to October 20th, have been used; viz.: the regular tri-daily weather charts, containing the data of simultaneous observations taken at one hundred and thirty-six Signal Service stations and fifteen Canadian stations, as telegraphed to this office; one hundred and ninety-four monthly journals and one hundred and eighty-two monthly means from the former, and twelve monthly means from the latter; two hundred monthly registers from voluntary observers; sixty-one monthly registers from United States Army Post Surgeons; Marine Records; International Simultaneous Observations; Marine Reports, through the co-operation of the "New York Herald," Weather Service; abstracts of Ships' Logs, furnished by the publishers of "The New York Maritime Register;" monthly reports from the local weather services of Kansas, Nebraska, and Missouri, and of the Central Pacific railway company; trustworthy newspaper extracts; and special reports.

BAROMETRIC PRESSURE.

[*Readings expressed in inches and hundredths.*]

The mean barometric pressure for the month over the United States and Canada, is shown by the isobarometric lines (in black) on chart number ii. The area of lowest mean-pressure covers the western parts of the middle and southern plateau districts, the lowest mean (29.84) being reported from Campo. From an examination of chart number ii., for previous months, it will be seen that, since March, the region of lowest mean-pressure has occupied nearly the same position. East of the one-hundredth meridian, the pressure is very evenly distributed. From the Missouri valley eastward to New England, the pressures range from 30.05 to 30.09; and in the Gulf states from 30.01 to 30.07. Compared with the previous month, the pressure is higher in almost every district; the most marked increase (0.16) occurring at Santa Fé. East of the Rocky mountains, the increase ranges from 0.01, to 0.11 being greatest at the more northerly stations. In Florida there has been a decrease of from 0.04 to 0.06, while along the Gulf coast the pressure has remained nearly the same. In the north Pacific coast region and in the western part of the northern plateau district, a slight decrease, ranging from 0.01 to 0.03, has also occurred. In California, there has been an increase of from 0.01 to 0.05, the greatest being reported from Campo.

DEPARTURES FROM THE NORMAL VALUES FOR THE MONTH.

Compared with the September means of previous years, the pressure in the northern plateau district and in the north Pacific coast region is from 0.01 to 0.05 below the normal, and in Florida, from normal to 0.02 below. With the exception of slight deficiencies at a few scattering stations, the pressure elsewhere over the country, is from normal to 0.16 above, the greatest departures occurring in the upper lake region.

BAROMETRIC RANGES.

The ranges of pressure during the month have varied from 0.20 at Campo, California, to 1.07, at Alpena, Michigan. In the several districts the barometric ranges have been as follows:

New England: From 0.65 at New Haven to 0.95 at Eastport.

Middle Atlantic states: From 0.63 at Lynchburg to 0.87 at Chincoteague.

South Atlantic states: From 0.64 at Jacksonville to 0.90 at Atlanta.

Florida peninsula: From 0.26 at Key West to 0.63 at Cedar Keys.

East Gulf states: From 0.42 at Starkville to 0.85 at Pensacola.

West Gulf states: From 0.40 at Indianola to 0.57 at Fort Smith, and 0.79 at Port Eads.

Rio Grande valley: From 0.36 at Rio Grande City to 0.47 at Eagle Pass.

Ohio valley and Tennessee: From 0.39 at Memphis to 0.62 at Chattanooga.

Lower lake region: From 0.63 at Cleveland and Sandusky to 0.88 at Oswego.

Upper lake region: From 0.65 at Chicago to 1.03 at Mackinac City and 1.07 at Alpena.

Extreme northwest: From 0.67 at Moorhead to 0.83 at Fort Stevenson and 0.84 at Saint Vincent.

Upper Mississippi valley: From 0.40 at Cairo to 0.77 at La Crosse and Saint Paul.

Missouri valley: From 0.49 at Springfield, Missouri, to 0.70 at Huron, Dakota.

Northern slope: From 0.53 at Cheyenne to 0.85 at Fort Keogh.

Middle slope: From 0.52 at Fort Elliott to 0.62 at Denver.

Southern slope: From 0.35 at Fort Davis to 0.61 at Henrietta.

Southern plateau: From 0.28 at Fort Grant to 0.42 at Santa Fé.

Middle plateau: From 0.53 at Winnemucca to 0.62 at Salt Lake City.

Northern plateau: From 0.44 at Dayton to 0.64 at Fort Missoula.

North Pacific coast region: From 0.55 at Portland to 0.60 at Roseburg.

Middle Pacific coast region: From 0.38 at San Francisco to 0.55 at Cape Mendocino.

South Pacific coast region: From 0.20 at Campo to 0.32 at Visalia and 0.43 at Yuma.

AREAS OF HIGH PRESSURE.

The following may be given as the general movement of areas of high-pressure, and as the conditions attending their development, during the month. Ten areas have had sufficient definiteness to merit notice; of these No. i., is the same as ix. of the August REVIEW, Nos. ii. and vi., of slight importance, were noted only in Canada, and the remaining seven (iii. iv. v. vii. viii. ix. and x.) were first observed off the Pacific coast, and all except vii. advanced to the eastward of the Rocky mountains.

No. I.—This is the same as ix. of August REVIEW, and passed into the Atlantic on the 3d, on which day it was merged in No. ii., and seems to have spread over an extensive area without losing its height. The highest pressure observed was 30.17 inches in Nebraska on the 1st.

No. II.—This area appeared in Ontario on the 2d and was merged with i. as above.

No. III.—This was first noted on the Pacific coast off Washington territory on the 2d. It moved nearly due east across the Rocky mountain plateau for two days and, on the afternoon of the 3d, was augmented by an offshoot from i. in southern Nebraska. From this point the motion was very rapid toward the northeast as it passed into the Atlantic on the 6th. The highest pressure was 30.32 inches at Chatham on the morning of the 6th.

No. IV.—This was first seen on the Pacific coast on the 4th, closely following iii. and was merged in the latter on the 6th. The highest pressure, 30.24 inches, occurred at Fort Assiniboine on the morning of the 5th.

No. V.—This area was first noted off the coast of Oregon on the 6th, can be followed in an erratic course for fifteen days finally passing into the Atlantic off the South Carolina coast on the 20th. It was central over the upper lake region on the 10th and there augmented by a portion of vii., as given below. From this point its course can be traced southeasterly toward the Atlantic; it was central over northern Alabama on the 14th and from thereit swung back on the 15th to Tennessee. From this point it moved steadly eastward passing into the Atlantic off the South Carolina coast. The highest pressure, 30.26 inches, was observed at Rockliffe on the 13th.

No. VI—This appeared in the upper lake region on the afternoon of the 7th, and spread over the whole northern boundary of the United States, east of Minnesota, by the 9th. On the next day it separated into two portions, one of which moved into the Atlantic, while the other was merged in v., as above. The highest observed pressure, 30.21 inches, was at Anticosti on the morning of the 9th.

No. VII—This first appeared off the coast of California on the 11th, but seems to have made no advance, as it disappeared off the coast of Oregon on the 16th.

No. VIII.—This appeared, like the last, off the coast of California, and was first noted on the 18th. It was evidently of great extent as, at midnight of the 18th, uniformly high-pressure prevailed along the whole northern boundary of the United States from the Pacific to Minnesota. It was divided by the Rocky mountains on the 20th. The western part will be designated hereafter as No. ix. On the 21st, viii. had advanced toward the east and had united with an area of high-pressure to the north of Canada, while an offshoot extended into Iowa. The pressures on the morning of the 21st were very high, namely: 30.48 inches in viii. at Father Point and 30.56 inches in ix.; at Fort Benton. No. viii. passed off the coast at Newfoundland on the 22d. The highest pressure was 30.56 inches at Chatham midnight of 21st.

No. IX.—On the 21st, this was central in western Montana; on the 22d, it had united with the off-shoot mentioned in viii. above, and we find a ridge of high-pressure (about 30.26 in.) extending continuously from British Columbia to Mississippi. On the next day, the 23d, this "high," somewhat contracted in dimensions, was central over Missouri, and from there advanced slowly toward the northeast, it being plainly evident over northern Canada on the last day of the month. In connection with the development and progress of areas viii. and ix., we find the severest frosts of the month; these occurred in Minnesota and Michigan on the morning of the 20th, in Nebraska on the 21st, and in Montana, Dakota and Minnesota on the 22d and 23d. (See "FROSTS.")

No X.—This was first noted off the coast of Oregon on the afternoon of the 26th. It remained nearly stationary till the 28th, but on the 29th had moved to the north of Montana, and on the last day of the month was merged with ix., as above. The highest pressure, 30.25 inches, was observed at Fort Buford on the afternoon of the 29th.

AREAS OF LOW BAROMETER.

Four areas of low barometer have been sufficiently defined to merit charting. Of these number i., developed near the Rio Grande valley, and, showing but slight energy, moved in a northerly track to the lake region.

Number ii., the most memorable storm of the month, perhaps of the year, was a tropical hurricane, first noted by this bureau south of Grand Turk island, but it is evident that at the time it passed that island it was a fully-developed hurricane, pursuing the usual parabolic path of a tropical storm, moving to the northwest until it reached the latitude of 30° north, when it recurved to the northeast.

Number iii., is the only depression traced from the Pacific coast, and which, after midnight of the 13th, suddenly developed unusual energy. It will be remembered on account of the

great loss of life that accompanied the foundering of the s.s. "Asia" in the Georgian bay.

The origin of low area number iv., is somewhat obscure. It never manifested special violence and ceased to exist as a well-defined low pressure on the 24th.

The following table gives the latitude and longitude in which each area was first and last observed, and the average hourly velocity:

Areas of low barometer.	First Observed.		Last Observed.		Average velocity in miles per hour.
	Lat. N.	Long. W.	Lat. N.	Long. W.	
	° ′	° ′	° ′	° ′	
No. I.	29 00	97 00	48 00	85 30	35.4
II.	21 00	71 00	46 00	61 00	14.7
III.	49 00	124 00	47 00	61 00	28.8
IV.	33 00	77 30	40 30	72 30	15.0

The following table gives the number of areas of low-pressure since 1873 during the month of September:

Year.	No.	Hourly velocity.	Year.	No.	Hourly velocity.
1873	11	—	1878	12	23.9
1874	13	—	1879	7	21.7
1875	8	—	1880	13	23.5
1876	10	23.8	1881	7	30.6
1877	8	15.8	1882	4	23.5

I.—At the last report of the month of August, a depression of slight energy was central near Indianola, Texas. At the morning observation of the 1st, the lowest pressure reported was at Little Rock; during the day the depression moved slightly to the east of north to lake Michigan, accompanied by light rains and light to brisk winds. On the 2d, the low area traversed lakes Michigan and Superior, passing beyond the limits of the chart, and rain generally fell in the lake region.

II.—The earliest information now in this office of the movement of this hurricane is from the meteorological observations taken at 10:00 a. m., local time, at Grand Turk island, when on the 2d of September the barometer was 29.79, wind ne., strong; and on September 3d the barometer was 29.76, wind sw., strong. The local report says, at Grand Turk island there was considerable wind and rain on Sunday, the 3d of September, which continued during the night up to daylight of the 4th. During the night there was experienced the heaviest thunder-storm on record since 1852. The shifting of the wind shows the passage of the storm to the south of Grand Turk island before the morning of the 3d.

The following reports extracted from the logs of the s.s. "Alene," and the brig "John Wesley," show that they crossed the path of the hurricane on the 3d and 4th, and in advance of its centre:

S. S. "Alene," Captain H. R. Hughes.

Date.	Time.	Lat. N.	Long. W.	Bar.	Temp.	Wind.	Force.	Weather and remarks.
		° ′	° ′		°			
Sept. 3	7:11 a. m...	19 39	74 17	30.00	...	nne.	1	Clear and fine; sea-swell ne.
4	8:00 a. m...	.....	.....	.....	...	.....	...	Weather gloomy and threatening; wind backed to w., thence to southward and eastward.
4	4:00 a. m...	.....	.....	29.70	...	.....	...	
4	6:00 a. m...	.....	.....	29.65	...	.....	...	The gale at its height between these observations. Violent squalls from se., accompanied with heavy rain and hail; sea rising rapidly.
4	7:10 a. m...	23.11	74.25	29.95	...	se.	7	Overcast.
4	7:30 a. m...	.....	.....	29.75	78	se.	6	
4	8:00 a. m...	.....	.....	29.80	...	ese.	6	
4	9:00 a. m...	.....	.....	29.85	...	ese.	6	
4	10:00 a. m...	.....	.....	29.90	79	ese.	...	Sea subsiding.
4	11:30 a. m...	.....	.....	29.97	80	se. by e.	...	
4	12:00 noon ..	.....	.....	29.98	80	.....	...	
4	1:30 p. m...	.....	.....	29.98	80	ese.	5	
5	7:12 a. m...	27.05	74.30	30.13	...	e.	3	Clear and fine; sea-swell ese.

Brig "John Wesley," Captain John H. Hines.

Date.	Time.	Lat. N.	Long. W.	Bar.	Wind.	Force.	Weather and remarks.
		° ′	° ′				
Sept. 2	7:10 a. m...	22.30	74.25	29.84	ne by e.	4	Clear; sea smooth.
3	7:08 a. m...	.....	.....	29.51	ese.	10	Rain and blowing; very heavy sea.
4	7:11 a. m...	25.24	74.15	29.91	e. by s.	5	Fair; heavy cross swell.

The following observations were reported by the same captain as taken at Greenwich date and time during the passage of this storm:

Date.	Baro'eter.	Wind.	Remarks.
Sept. 3.			
12 noon.....	29.84	e.	A heavy bank at ese.; sky full of cirrus and cirrus-stratus, moving apparently to wnw. Vessel in Crooked Island passage; after getting through the passage found a high swell from ese.
4 p. m	29.86	.....	Wind very puffy, with sprinkling rain.
5 "	29.87	ene.	Wind and rain increasing.
6 "	29.83	.....	Blowing strong, with heavy rain and high sea; hove to.
8 "	29.51	.....	Blowing very hard, with very heavy rain.
10 "	29.18	e.	Blowing terrifically.
12 midn't ..	29.83	ese.	Do.
Sept. 4.			
2 a. m.....	28.94	se.	Do.
4 "	29.14	se. by s.	Moderating at times.
6 "	29.35	se by s.	Do.
10 "	29.46	.....	Moderating and clearing, but very high sea.
12 noon.....	29.51	ese.	All sails set; passed close to Rum Key.

The s. s. City of San Antonio experienced, on September 4th, in latitude N. 26° 45′, longitude W. 76° 50′, a very heavy swell from ese., with squally weather, and e. by n. wind. During these squalls the wind increased to a heavy gale, with barometer falling slowly until 8 p. m.

The following reports, received through the courtesy of Rev. Benito Vines, S. J., show the track of this meteor over the island of Cuba. Very copious extracts are given in order to preserve a permanent record of its passage over this island.

Observations taken at Isabella de Sagua, September 4 and 5, 1882.

Time.	Barometer.	Therm'er.	Wind.	Force.	Weather.
		°			
Sept. 4.					
12 m.	29.92	73.4	n.	brisk.	squally.
4 p. m.	29.80	72.5	nne.	gale.	"
5 "	29.76	72.5	nne.	"	"
6 "	29.72	72.5	nne.	"	misty and cloudy.
7 "	29.69	71.6	ne.	"	" " "
8 "	29.69	71.6	ene.	"	" " "
9 "	29.69	70.7	ene.	gale, with gusts.	raining.
10 "	29.69	70.7	e.	" "	"
11 "	29.71	69.8	e¼se.	" "	"
12 mid't	29.71	69.8	e¼se.	gale.	"
Sept. 5.					
1 a. m.	29.71	69.8	ese.	gale.	raining.
2 "	29.71	69.8	ese.	"	"
3 "	29.72	68.9	ese.	gale, with gusts.	"
4 "	29.74	68.9	se¼e.	" "	"
5 "	29.76	68.9	se¼e.	" "	"
6 "	29.78	68.9	se¼e.	" "	"
8 "	29.84	68.0	se.	fresh.	"
10 "	29.86	68.0	se.	"	"
1 p. m.	29.86	68.9	se.	"	"
3 "	29.86	68.9	se.	"	"
6 "	29.92	69.8	se.	"	cloudy.

The centre of the hurricane passed south of this station during the evening of the 4th.

Observations taken at Cienfuegos on September 5, 1882.

Time.	Bar.	Tem.	Wind.	Force.	State of weather.
		°			
Sept. 4.					
12 m.	29.95	91	ne. and n.	0	Light clouds moving rapidly.
4 p. m.	29.89	88	n.	0	Swift light clouds.
6 "	29.85	86	n.	0	" " "
10 "	29.84	82	n.	0	Stars visible in zenith.
12 midn't	29.82	82	n.	2	Large nimbus clouds between 1 and 2 quadrants.
Sept. 5.					
2 a. m.	29.76	80	nw.	3	Heavy gusts of rain.
8 "	29.66	80	nw.	3	" " "
9 "	29.50	78	nw.	4	Hurricanes, gusts.
9:30 "	29.50	78	wnw.	4	Violent gusts of wind and rain. Telegraph communication interrupted.
10 "	29.38	78	wnw.	4	Hurricane.
10:15 "	29.31	78	w. ¼ nw.	4	The gloomy and cloudy weather obstructed the sight of the vessels in the bay. Vortex to n. and near.

Observations taken at Cienfuegos on September 5, 1882—Continued.

Time.	Bar.	Tem.	Wind.	Force.	State of weather.
		°			
10:30 "	29.27	78	w.	4	
10:45 "	29.22	78	w.	4	Greatest intensity.
11 "	29.18	78	w. ¼ sw.	4	Blowing with great force.
11:30 "	29.13	78	wsw.	4	" " "
11:45 "	29.15	78	sw. ¼ w.	4	Barometer rising.
12 m.	29.16	78	ssw.	4	Gloomy appearance, rain in torrents.
12:30 p. m.	29.18	78	ssw.	4	Gloomy appearance, rain in torrents.
1 "	29.27	78	ssw.	4	" " " "
1:30 "	29.32	78	s. ¼ sw.	4	" " " "
2 "	29.44	78	s. ¼ sw.	4	Less wind gusts and of shorter duration.
2:30 "	29.46	78	s. ¼ sw.	4	A few small vessels stranded and otherwise damaged.
3 "	29.46	78	s.	4	Gusts diminishing.
3:30 "	29.49	78	s.	4	Rapid gusts.
4 "	29.55	78	sse.	4	Heavy rain.
4:30 "	29.57	78	sse.	4	" "
5 "	29.60	78	sse.	4	" "
5:30 "	29.62	78	se.	4	" "
6 "	29.66	78	se.	4	Rain and gusts.
7 "	29.70	78	se.	4	Strong wind with lasting gusts.
8 "	29.78	78	se.	4	" " " " "
9 "	29.79	78	se.	4	Heavy rain and strong wind.
10 "	29.80	78	se.	3	Gusts at intervals.
11 "	29.80	79	se.	3	" " "
12 midn't	29.80	79	se.	3	" " "

The storm-centre moved to the north of Cienfuegos.

The following is an extract of a report furnished from Cardenas, September 6, 1882:

On Sunday, September 3d, at 6 p. m., the sky began to be covered with small clouds, moving rapidly along the horizon, with violent gusts of rain and slowly falling barometer.

September 4th, barometer stationary, with more frequent gusts of rain and wind.

September 5th, 6 a. m., repeated gusts of wind and rain; 11 a. m., increasing wind and rain; 2 p. m., wind veered to ene., with violent wind, heavy rain and falling barometer; 3 p. m., wind veered to e.; 6 p. m., wind shifted to e ¼ se.; 9 p. m., slowly rising barometer.

September 6th, at 1:00 a. m., the wind abated somewhat and veered to se., with continued rain; 4 a. m., wind se., decreasing steadily up to daybreak, when the puffs became still less frequent. The barometer, of which the mean height is 30.20 inches, had fallen to 29.80.

This house was badly damaged, though well protected, leaking everywhere. The garden was completely demolished, even the smallest plants having been carried away.

A few vessels in the harbor were injured, though not seriously; at 3 p. m., the barometer read 30.10, with rain at short intervals.

Observations taken at Matanzas on September 5, 1882.

Time.	Baro'ter.	Temp.	Wind.	Force.	Weather.
8 a. m.	29.97	82	nne.	3	showery.
10 "	29.95	82	ne.	3	"
12 m.	29.91	82	ne.	3.4	squally.
1 p. m.	29.89	82	ne.	3.4	"
2 "	29.85	82	ne.	3.4	"
3 "	29.82	81.5	ne.	3.4	"
4 "	29.77	81	ne. ¼e.	4	"
5 "	29.74	80.5	ene.	5	"
6 "	29.74	80	e.	5	"
7 "	29.73	80	ese.	5	"
8 "	29.75	80	se.	5	"
9 "	29.79	79.5	se.	4	"
10 "	29.80	80	se. ¼e.	4	showery.
11 "	29.82	79	se. ¼e.	4	"
12 mid't	29.86	79	se.	3.4	squally.
1 a. m.	29.88	79	se.	3.4	showery & rainy.
2 "	29.90	78.5	se.	3	" "
3 "	29.93	80	se.	3	" "
4 "	29.94	79.5	se.	2	rainy.
5 "	29.95	79	se.	1	"
6 "	30.00	79	sse.	0	"

In consequence of the heavy sea and wind the brig "Pepe", the schooner "Carlotta" and the fishing vessel "Leon Despierto" were beached; all were saved however with the exception of the schooner "Carlotta", which was grounded on rocks. The storm-centre evidently went south of Matanzas.

Observations taken at Belen, Havana, September 5 and 6, 1882.

Time.	Baro'ter.	Therm'er.	Wind.	Vel. in miles per hour	Weather.
Sept. 5th.					
4 a. m.	29.88	79.9	nne.	10.1	Sudden gusts of wind and thunder.
5 "	29.90	82.0	nne.	15.7	Thunder.
6 "	29.88	82	nne.	11.3	Cloudy.
6.38 "	29.89	82.2	nne.	13.0	Rain began 6.47 a. m.
8 "	29.89	82.6	n. ½ne.	11.2	Thunder and lightning.
9 "	29.90	80.4	ne. ½n.	10.1	Cloudy.
10 "	29.89	84.6	nne.	11.2	Showery.
11 "	29.91	85.6	n.	13.4	Cloudy.
12 m.	29.87	85.6	nne.	15.7	Plain solar halo.
1 p. m.	29.84		ne. ½n.	19.0	Clouds dense and low; max. vel., 44.7.
2 "	29.80	86.2 85.6	n. ½ne.	17.9	Threatening, violent gusts; max. vel., 31.3.
3 "	29.82	83.3	.....	.....	
4 "	29.78	83.3	ne. ½e.	17.9	Cloudy and very dark; max. vel., 44.7.
5 "	29.76	82.6	nne.	22.4	max. vel., 40.3.
6 "	29.73	82.4	nne.	24.6	Wind gusts; max. vel., 53.7.
7 "	29.72	81.1	ne.	31.3	Violent wind gusts; max. vel., 40.3.
8 "	29.70	80.1	ne. ½n.	26.8	Rain and wind gusts; max. vel., 53.7.
9 "	29.70	78.4	ne. ½e.	24.6	Violent wind gusts; max. vel., 53.7.
10 "	29.69	78.1	ene.	26.8	Violent wind gust and very dark; max. vel., 69.3.
10.30 "	29.69	.....	ne. ½e.	24.6	Max. vel., 58.2.
11 "	29.66	.....	ene.	.....	Max. vel., 71.6.
11.30 "	29.64	.....	.....	.....	
12 mid't	29.63	.....	e.	35.8	Strong and constant wind gusts; max. vel., 58.2.
Sept. 6th.					
12.30 a. m.	29.62	.....	e. ¼ne.	43.6	Violent and constant wind gusts; max. vel., 67.1.
1 "	29.59	.....	e. ¼ne.	.....	
1.30 "	29.59	.....	e. ¼ne.	40.3	Short hurricanes; max. vel., 78.3.
2 "	29.61	.....	e.	35.8	Short hurricanes; max. vel., 85.0.
2.30 "	29.64	.....	e.	43.6	Violent gusts, bar. rising; max. vel., 44.7.
3 "	29.65	.....	e. ¼se.	35.8	Successive gusts; max. vel., 53.7.
5 "	29.72	76.5	e. ¼se.	31.3	Violent gusts; max. vel., 44.7.
5.30 "	29.73	.....	ese.	26.8	Violent gusts; max. vel., 49.2.
6 "	29.73	76.3	se.	24.6	Light rain; max. vel., 26.8.
6.38 "	29.80	76.5	se.	24.6	Raining; max. vel., 26.8.
7 "	29.80	76.3	se.	24.6	Raining.
7.30 "	29.84	.....	.....	26.8	Violent wind; max. vel., 26.8.
8 "	29.84	77.2	se.	15.7	Violent winds.
9 "	29.87	76.3	ese.	11.3	Violent winds.
10 "	29.89	76.5	ese.	20.1	Rain and sudden gusts.
11 "	29.91	78.6	se. ¼e.	.....	Constant rain.
12 m.	29.89	78.1	se. ¼e.	15.7	Constant rain; max. vel., 20.0.
1 p. m.	29.90	77.4	se.	11.2	Mist.
2 "	29.87	78.1	se. ¼e.	10.1	Mist.

The vortex went south of Havana between 12:30 a. m. and 2 a. m. of the 6th.

Observations Taken on Board the "Gral Duran" at Batabano, September 5 and 6, 1882.

Time.	Baro'ter.	Temp.	Wind.	Force.	Weather
Sept. 5.					
6 p m.	30.15	77	n.	7	threatening.
7 "	30.12	77	nne.	7	heavy rain.
8 "	30.10	77	ne.	8	" "
9 "	30.08	78.8	ne. ¼e.	8	very threatening.
10 "	30.06	78.8	ene.	8	" "
11 "	30.02	78.8	e.	10	" "
12 mid't	29.90	78.8	ese.	11	gusts of rain.
Sept. 6.					
1 a. m.	29.85	78.8	se.	11	gusts of rain.
2 "	29.88	78.8	se.	10	heavy showers.
3 "	29.90	78.8	se.	10	rain and thunder.
4 "	30.00	77	se.	9	raining.
5 "	30.03	77	se.	8	"
6 "	30.05	77	se.	8	"
7 "	30.08	77	se.	7	"

The centre of the storm passed south of the anchorage of Batabano.

Observations taken at Nueva Gerona, Pinos Island, during September 5 and 6, 1882, on board the s. s. "Nuevo Cubano."

Time.	Bar. aneroid	Wind.	Force.	Remarks.
Sept. 5th.				
a. m.	30.24	nnw.	moderate	Sky threatening towards the 1st quadrant; heavy gusts of wind and rain at intervals.
12 m.	30.20	nnw.	fresh.	Same appearance.
4 p. m.	.....	nw.	brisk.	Continued gusts of wind and rain.
6 p. m.	30.16	ne. shifting to sw.	.....	Clear between 3d & 4th quadrants.
8 p. m.	30.04	nw.	.....	Wind and rain gusts.
9 p. m.	29.98	.....	.....	Wind and rain gusts of short duration.

Observations taken at Nueva Gerona, Pinos Island, during September 5 and 6, 1882, on board the s.s. "Nuevo Cubano"—Continued.

Time.	Bar. aneroid	Wind.	Force.	Remarks.
Sept. 6th. 2 a. m	29.84	sw.		From 9 p. m. to 2 a. m. the barometer fell steadily, attended by heavy wind and rain gusts; becoming very dark.
2.30 a. m.		sw.		Very violent squalls.
3.00 a. m.	29.88			
3.30 a. m.	29.92			
4.00 a. m.	29.96			
4.30 a. m.	30.00			

The vortex went north of the Isle of Pines.

Observations taken at Bahia Honda, September 5 and 6, 1882.

Time.	Barometer. (aneriod.)	Therm'er.	Wind.	Force.	Weather.
Sept. 5.					
8 a. m.	29.53	82.4	n.	6	Threatening.
12 m.	29.37	78.8	nne.	8	"
1 p. m.	29.29	78.8	ne. ¼ n.	8	"
2 "	29.17	78.8	ne.	9	"
4 "	29.17	78.8	ne. ¼ n.	10	"
4 "	29.17	77.0	ene.	10	"
5 "	29.25	77.0	e.	10	
6 "	29.29	78.8	e. ¼ ne.	10	
7 "	29.37	78.8	ese.	9	
8 "	29.41	78.8	se. ¼ e.	9	
9 "	29.45	78.8	se. ¼ e.	9	
10 "	29.49	78.8	se.	8	
12 mid't.	29.53	78.8	se.	8	
Sept. 6.					
3 a. m.	29.57	78.8	se.	6	
6 "	29.65	78.8	se.	3	

This shows the storm-centre moved south of Bahia Honda, but it is thought the dates and hours as copied, are not accurate.

After leaving the island of Cuba, the hurricane began to recurve towards the north and was encountered by the s. s. "City of Alexandria," Capt L. F. Timmerman, which entered the vortex of the storm between 6 and 7 p. m., of the 6th.

The following is an extract of the ship's log, furnished by co-operation of the "New York Herald Weather Service:"

Date and time. Local.	Date and time. Greenwich	Lat. N.	Long. W.	Barome'er. (Aneroid.)	Therm'r.	Wind.	Force.	Remarks.
Sept. 6.		° ′	° ′					
		22 20	6 42	29.85	84	n.	3	Gloomy.
12.00 m.	5.45 p. m.	2 30	86 0	29.40	84	nnw.	6	Set of sea ne.; sho'ery & threatening; high ne. sea.
2.00 p. m.	7.45 "	22 37	85 50	29.20	84	nw. & n.	9	" "
4.30 "	10.15 "	22 40	85 45	28.98	84	nw.	12	Rain & squally; sea ne. and nw.
5.30 "	11.15 "	22 42	85 40	28.98	84	calm	0	Fair and gloomy; sea ne. and nw. air full of tired birds.
7.00 "	12.45 a. m.	22 45	85 35	28.99	83	s. & e.	12	Rainy, squally and lightning; sea nw.
10.00 "	3.45 "	22 50	85 14	30.40?	82	sse.	9	" "
12.00 mid't	5.45 "	23 05	85 0	30.60?	82	sse.	8	Rain and squally; sea nw. and s.
Sept. 7.								
4.00 "	9.45 "	23 10	84 28	30.70?	83	s. & e.	6	Fair; sea nw. & s.

The barometer in the last three observations is probably one inch too high.

The "City of Alexandria" on the 10th, 11th, and 12th, became again involved in this storm after it had recurved to the northeast and crossed its track in rear of the centre of the storm.

The following extract of the log of the s. s. "City of Puebla," Captain John Deaken, furnished by co-operation of the "New York Herald Weather Service," shows that the cyclone was felt by this vessel.

Date.	Lat. N.	Long. W.	Bar.	Temp.	Wind.	Vel'y in knots.	Weather & remarks.
	° ′	° ′		°			
Sept. 5.			29.79	86	ne.	18	Passing showers; increasing wind.
" 5.			29.62		nne.	30	Blowing heavy.
" 6.	22 48	86 11	29.60	85	une.	30	Squally; wind backing to nw.
" 6.			29.50	85	nnw.	30	
" 6. midnight.			29.49				
" 7.	21 21	89 38	29.68	82	wsw.	6	Cloudy; wind off the coast—sea s.
" 8.	21 21	89 38	29.70	86	ssw.	6	Hazy; black clouds to the n.
" 9.	19 54	90 45	29.76	86	w.	6	Cloudy.

NOTE—The hours of observation are not given.

Between the 8th and 9th of September, this storm was encountered by the s. s. "Rio Grande," between latitude N. 25° 33′ and 25° 44′, and longitude W. 85° 45′ and 87° 20′. Captain A. C. Burrows, of that steamer, gives the following description, "On the 7th September, while stopping at Key West, I was informed that a cyclone had passed south side of Cuba, travelling nw. on 5th, with this warning I proceeded in a wnw. direction until midnight of the 8th, when appearances of the wind and weather and action of barometer induced the belief on my part that the storm was recurving and inclining to a nne. or n. course. The wind was then blowing an ordinary gale, with confused sea from s. to w. Direction of wind sse. The ship's head was then put se., and engines worked slowly, to just keep ship in position, and the situation remained unchanged for twenty-one hours, when, with violent rains and heavy puffs, the wind gradually, but quickly, worked round to sw.—w. and wnw., and the glass began to rise, weather becoming fine."

The following extract of the log of s. s. "Chalmette," Captain Frederick Read, shows that this vessel encountered the cyclone September 7th and 8th:

Date.	Time	Lat.	Long.	Bar.	Tem.	Wind	Force	Weather and Remarks.
	a. m.	° ′	° ′		°			
Sept. 6...	6.08	29 47	89 53	30.07	78	e.	2	clear.
" 7...	6.23	27 05	86 20	29.95	81	ese.	8	cloudy; h'vy sse. sea-swell
" 8...	6.37	24 22	82 47	29.99	83	se.	2	fair; mod. sw. sea-swell

Capt. F. Read makes the following remarks in regard to this storm: "Having been in close quarters with the terrible cyclone of the 8th and 9th instant, off the Passes, I will give an account of our experience on a direct line from the Passes to Tortugas. Crossed the bar at 5:12 p. m., (Greenwich time) the 6th instant, had fine weather, and light breezes from the ese., with smooth sea until 11 p. m., when I noticed a long swell heaving from the ese., which soon increased, so that by 4 a. m., of the 7th, the ship would occasionally pitch bows under. The wind at this time had also increased and was blowing a fresh gale from ese., the glass at 29.70, and soon commenced to rise slowly, the sea gradually hauling southerly and to the ssw., without diminishing, the wind still ese. strong. This showed us to be on the northern quadrant of a storm, and I knew there was much more wind to the s. and w. of us. It continued until 4. p. m., when both sea and wind gradually moderated with clearing weather, the glass at 29.90. By 8 a. m., of the 8th, when 40 miles nw. of Tortugas, had run entirely out of it, having then but a fresh breeze from se., and a moderate sea swell from sw.

"From Tortugas, north, had light variable weather with considerable rain; at 10:50 p. m. of the 11th instant, five miles east of Egg harbor, a light air from sw., and quite a heavy swell heaving in from se., a hazy sky and something that appeared like a fog bank all around the horizon, the glass at 29.50. The wind very suddenly came out from north, and in one hour was blowing a strong gale from nne., with heavy sea and raining almost continually until 5 a. m. (Greenwich time) of the 12th, the wind gradually veering to the nnw. At daylight, when four miles off Long Branch, the wind and sea moderated, the glass at 29.70, with clearing weather."

The Chalmette evidently crossed in front of the hurricane

as it was recurving to the northeast, and again encountered the same storm in its northern trajectory, and crossing its path in rear of the centre of the storm.

Captain James Wallace, s. s. "Burswell," who encountered this cyclone in latitude N. 26° 00′, W. 85° 40′, on the 9th instant, gives the following description: "At 1:30 (Greenwich time), or 7:40 a. m., local time, gale increased from south, sky very dirty, high cross sea from s. and wsw. eased engines and brought ship's head to the ssw. At 6 p. m. (Greenwich time), a fierce storm of wind and rain, with a high confused sea, ship flooded with seas fore and aft, and rain coming down in a whole sheet. At 8 p. m. of the 9th, wind hauled to sw. and more moderate, a high sea from wnw. At 13 hours, (Greenwich time) moderate gale at sw., a high sea from the wnw., ship lying head to it with engines eased. At 18 hours, wind wsw., force 4, kept ship on her course to the nw. At 24 hours (Greenwich time), of the 9th, wind w., a strong high sea from the north, with fine clear weather; lowest reading of barometer at 8 hours, 29.68."

The following is an extract of observations taken on board of this vessel:

Date.	Time.	Lat.	Long.	Bar.	Temp.	Wind.	Force.	Weather.
		° ′	° ′		°			
Sept. 8	6.35 a. m.	24 28	83 05	29.96	87	sse.	3	Fine weather, strong sea-swell.
" 9	6.23 "	25 51	85 34	29.70	87	s.	7	Dull and threat'ng strong sea-swell from sw.
" 10	6.20 "	26 26	86 45	29.78	83	w.	4	Fine and clear, strong sea-swell from n.

The following extract from the log of the s. s. "Lone Star," Captain R. B. Quick, furnished by co-operation of the "New York Herald Weather Service," shows the presence of this storm in latitude 28° 15′ N., longitude 88° 05′ W., on the 9th instant: September 9th, latitude 28° 15′ N., longitude 88° 05′ W., barometer 29.38, temperature 82, wind ese, hard gale, heavy cross sea from se. to e., and hard rain. Captain Quick, also took hourly observations during the passage of this storm, made the following report direct to this office: The s. s. "Lone Star," from New York for New Orleans encountered the cyclone of September 9th, in latitude 28° 15′, longitude 88° 05′, about sixty-five miles se. by e. from Port Eads. The storm-centre passed directly over the ship. From 7:00 a. m. to 4:00 p. m. (local time), the barometer readings, &c., were noted hourly as follows:

Time.	Barometer.	Temp.	Wind.	Weather.
7 a. m	29.40	82°	ese.	rain.
8 "	29.30	82	ese.	"
9 "	29.20	.....	e.	"
10 "	29.00	.....	e.	"
11 "	28.80	.....	e.	"
12 m	28.50	.....	ne.	"

Shortly after noon the wind died away and blew in gusts from ne. to n. and nnw., the rain had ceased and although the clouds were heavy and dense, the sun would occasionally burst through. There was a fog or mist that confined the area of vision to about three or four miles from the ship. In this calm-centre were many hundreds of land birds of great varieties, which sought rest on the rigging in great numbers.

Time.	Barometer.	Wind.	Weather.
1 p. m	28.40	n.	Misty.
1.30 p. m	28.38	nw.	Rain.
2 p. m	28.38	nw.	.....
3 p. m	28.60	nw.	.....
4 p. m	28.80	nw.	.....

From 4:00 p. m., the wind moderated and the sky cleared with fast rising barometer. At midnight moderate gale, passing clouds, barometer 29.70. The wind blew with great violence from ese. and e., but nothing to be compared with the fury of the nw. blast from 1:30 to 3:00 p. m. It was almost impossible to draw breath, the ship being covered in a perfect sheet of foam, it being impossible to see ten yards distant.

NOTE.—The barometer from which readings are taken stands about .02 inch high as compared with daily printed Signal Service reports.

The following is an extract from observations taken at the navy yard, Pensacola, Florida, showing the presence of this storm on the 9th and 10th instants:

Date.	Barometer.	Temperature.	Wind.	Velocity (miles)	Weather.
Sept. 9.....	30.06	75°	ne. and e.	7	Cloudy and lightning.
10.....	29.44	68	nnw.	26	Cloudy and rainy.
11.....	30.05	73	w. and n.	2	Fair.

Lieutenant John B. Collins, U. S. N., Navy-yard, Pensacola, gives the following details: At 4:08 a. m., of the 9th, the barometer was 30.06, wind ne. and e., velocity 7, sky overcast, clouds coming from ne., with lightning to the south. During the day the wind shifted to ne., accompanied by light squalls of wind and rain. At 0.08. p. m., the barometer was 30.05, wind ne., velocity 23, with heavy squalls of wind and rain. At 8.08 p. m., the barometer had fallen to 29.85, wind ne., velocity 31, with very heavy squalls of wind and rain. At midnight the barometer reached the lowest point, 29.44, the wind ne., velocity 31; during the succeeding hour the wind backed to n. and e. At 4:08 a. m., of the 10th, the barometer was still at 29:44, wind nnw., velocity 26; the squalls of wind and rain had slightly moderated. At 0.08 p. m., the barometer had risen to 29.70, wind nw., velocity 8, and the rain had ceased. During the day the wind backed to wsw., followed by clear weather. Between midnight and 2:00 a. m., of the 10th, the centre of the cyclone appears to have approached nearest to this station.

NOTE.—Time and dates given are Greenwich. Barometer not corrected.

On the 8th, the circulation of winds in the Gulf of Mexico showed the approach of a tropical hurricane, and at the morning observation of the 9th it was apparent that the storm-centre was not far distant from Port Eads, where, during the day, the barometer fell to 29.39, and a maximum velocity of wind 92 miles, ne., was reported. The vortex of the hurricane passed at midnight east of Pensacola, but quite near to it; lowest barometer 29.35. On the 10th, the storm, increasing in size, but diminishing in energy, moved in a northeasterly track over Alabama, Georgia, and South Carolina. The minimum pressures reported from stations of observations were, Montgomery 29.56; Atlanta 29.37; Augusta 29.49; Savannah 29.56; Charleston 29.60; Charlotte 29.55. On land the maximum winds recorded were, Atlanta 41, ne.; Augusta 32, e.; Charlotte 28, se. On the 11th, the storm, which still continued to exhibit great energy, moved in a northeasterly path across North Carolina, as charted, and entered the Atlantic ocean; from this day, until it disappeared beyond the limits of the charts of this bureau, the centre of the storm was at sea. The cautionary signals displayed for this storm, were justified by the following maximum velocities: Key West, 28, e.; Port Eads, 92, e.; Mobile, 27, n.; Pensacola, 50, n.; Cedar Keys, 54, s.; Jacksonville, 36, sw.; Savannah, 36, s.; Charleston, 36, s.; Smithville, 40, sw.; Wilmington, 27, w.; Macon, 36, sw.; Hatteras, 42, sw., and off-shore 30, w.; Kittyhawk, 35, s., and off-shore, 32, n.; Cape Henry, 35, nw.; Chincoteague, 31, e., and off-shore, 27, nw.; Delaware Breakwater, 32, e., and off-shore, 56, n.; Cape May, 29, e., and off-shore, 44, n.; Atlantic City, 31, n.; Barnegat, 48, ne.; Sandy Hook, 47, ne.; New York, 31, ne.; New Haven, 30, ne.; Block Island, 54, e., and off-shore, 32, n.; Newport, 26, n.; Provincetown, 34, ne.. and off-shore, 25, nw.; Boston, 26, ne.; Portland, 28, n., and off-shore, 26, nw.; Oswego, 26, ne.; Erie, 26, ne.; Sandusky, 40, ne.; Toledo, 28, ne.

The following extract from the report of the Signal Service observer at Port Eads exhibits the violence of the storm in that

vicinity. "The concrete blocks of the jetty walls were turned in all imaginable positions by the wind and the action of the Gulf waves. The railway by which the concrete was distributed is nearly entirely destroyed. The British s. s. "Haytian," Captain Peter, from Colon, with transit cargo for Europe, encountered the storm on the 9th instant, eighty-eight miles south of South Pass, hove to and rode out of the storm. Arrived September 10th, 2:30 p. m. Had heavy list to starboard on account of shifting of coal in bunker compartment of forehold. Bark "Windward," from Ship Island, with lumber for Europe, reported with fore and main masts gone. French s. s. "Clapeyron," Captain Guello, from Saint Thomas, reported having encountered the storm at 6:00 a. m., September 9th, sixteen miles off the South Pass bar. Damage—all boats broken, steering gear out of order, water-ballast tanks leaking, and bridge injured. Heavy list to starboard on account of shifting of coal. Lowest barometer 29.01. Rescued the crew of the American ship "Orient" about eighty miles south of this Pass, and saw another wreck, bottom up, with length of keel about one hundred and fifty feet. The "Orient" is a total wreck, entirely dismantled, upper decks amidships down to second deck gone, boats washed away, clean breach of sea through her cabin. Wreck of foremast, foretop-mast, and gallant-mast a mass of broken spars along deck and sides, also a portion of her mainmast. Cargo, lumber; value, $50,000.

British schooner "Ringdove," Captain E. Ward, bound from Ruatan to Mobile, cargo, green fruits and cocoanuts, encountered storm on 9th instant in latitude N. 26° 0′, longitude W. 87° 12′. Wind and rain from the south. Had to cut away mainmast to keep from foundering, leaking badly, and bananas nearly all rotted.

British schooner "Royalist," Captain E. Moore, bound from New Orleans to the Islands, had to put back on account of damage received. Rigging badly torn; one-half cargo of flour, wet; threw overboard one hundred barrels of rosin; four feet of water in hold.

Ship "Annie Gowdey," Captain Dent, from Pensacola for Belfast, with lumber, put into New Orleans for repairs. Fore and main-top-masts and mizzentop-gallant-masts cut away to save ship and cargo, which carried away lower mast-heads, poop-rail, ship's bells, jib-boom and everything attached, and stove in starboard boat. Deck, butts, water-way and covering-board seams badly strained, main rail broken, six feet two inches of water in hold. Hurricane from se. to nw., barometer at 12 midnight, 29.00; 3 a. m., 28.80; 6 a. m., 28.40; noon, 28.80.

Norwegian bark "Cato," Captain Kroger, from Rio Janeiro, with coffee, encountered storm eighty miles southeast of South Pass. Threw overboard four hundred sacks of coffee. Bulwarks stove in and vessel leaking, four feet of water in hold, some sails and reel-house blown away, lowest barometer, 28.01.

The following newspaper extracts give a description of the damage produced by this storm on land:

Havana, Cuba, 6th: The recent storm here extended over the greater part of the Island, doing the most damage at Villa Clara and Cienfuegos. The American bark "Idaho" and the British schooner "Sorata" were driven ashore at Cienfuegos.

Tuskeegee, Alabama, 9th: A heavy wind and rain storm visited this place last night. About 1,000 trees were blown down in the city. The storm was general in the country, and the damage to crops is estimated at $50,000.

Marvyn, Alabama, 9th: A destructive gale visited us on Saturday night, and resulted in very serious damage to the crops, and also destroyed a great deal of timber, blew down fences, &c.

Savannah, Georgia, 10th: The fury of the cyclone swept Savannah at three o'clock this morning. The velocity of the wind was forty-two miles per hour. The damage to the city is slight.

A double team near Beaufort was crushed by a falling tree; two men being killed and one injured. Reports from Ogeechee, Georgia, state that considerable damage was done to the crops by the storm.

Athens, Georgia, 10th: This town seems to have been an especial sufferer from the storm. The train on the Athens branch Sunday, was stopped seven times to cut away heavy trees which had fallen across the track. Along the street from the depot to the town, trees and timber were strewn, while some of the material for the extension road trestle was washed away. Over thirty five oak trees on the College Campus were uprooted or blown over, while many private groves are said to have been ruined, and fences demolished. The damage is estimated at $5,000. Advices from Warrenton indicate that great damage has been done along the Macon and Augusta road, fences blown down, trees uprooted, houses damaged and bridges swept away.

Atlanta, 10th: The storm prevailed here with terrible force, accompanied by heavy rain. Trees, fences, out-buildings and a few small houses were blown down, and tin roofs torn off.

Columbus, Georgia, 9th: A heavy rain and wind storm visited this section Saturday night and continued more or less during Sunday. Shade trees in the city were blown down by hundreds, and much damage has been done to cotton and corn, fences and forest timbers.

Macon, Georgia, 9th: Reports from all points in this section show that great damage was done to the cotton crop by the rain and wind storm of Saturday night.

Talbotton, Georgia, 9th: The most destructive rain and wind storm that has visited this county since 1856 occurred on Saturday night. The cotton and corn have been beaten down and lie upon the ground in the water. It is almost impossible to estimate the amount of damage done.

Pensacola, Florida, 9th: The storm was the severest ever known. The wind reached a maximum velocity of 55 miles per hour. The quarantine boat "Gov. Bloxham" capsized while en route from the quarantine station, and two men were drowned. The British bark "Roda" also capsized. Several vessels went ashore near the quarantine station and on Santa Rosa island. The interior wall of the new opera house was blown down, causing a damage of $1,500.

Jacksonville, Florida, 10th: Considerable damage is reported from middle and east Florida. The cotton crop is much damaged, in some places one-half the crop being ruined. At Quincy, many houses, fences, trees, etc., were prostrated, and five persons were killed.

Cedar Keys, Florida, 9th: The cyclone reached this section between 9:00 and 10:00 p. m., accompanied by torrents of rain and vivid lightning. The water rose until nearly all the business portion of the town was submerged. The tide was at least two feet higher than in the famous storm of 1873. The piazza of the custom-house was torn off and floated away. Stores were flooded and logs by the thousands were piled up in every direction, intermingled with boats, boxes, barrels, etc., being borne along by the water. The loss is estimated at about $100,000. Cedar sticks to the value of $18,000 were washed away from Fabers' factory and their wharf entirely demolished. The Eagle Pencil Company were also heavy losers in this way, although both companies will undoubtedly recover much of their property. The mill men and cross-tie shippers have their logs and ties scattered in every direction. The railroad is destroyed for a distance of nearly four miles, and the trestle, three-quarters of a mile in length, has completely disappeared, iron and all.

Greenville, South Carolina, 10th: A terrific gale from the northeast continued from 1 a. m., to 3 p. m., Sunday, accompanied by heavy rain. The wind at one time reached nearly fifty miles per hour. Many trees were uprooted and fences blown down, but no accidents occurred. The storm was the severest since 1852.

Ridgeville, South Carolina, 10th: The cyclone struck this town with tremendous force, blowing down stores, barns, and fences, uprooting trees, and filling the streets with timbers of every description.

Pendleton, South Carolina, 9th and 10th: A terrific wind and rain storm passed over during Saturday night and Sunday.

Many trees were blown down, bottom corn flooded and thrown down generally; upland corn was very much blown over, and the cotton plant also to a great extent levelled.

Charleston, South Carolina, 10th: The schooner "Florence Shay" experienced a severe gale on Sunday, continuing for eighteen hours, during which the vessel lost foresail, forejib, jibstay, &c.

Spartanburg, South Carolina, 9th: Between Columbia and Union great damage was done to corn by yesterday's storm. The stalks are prostrated to the ground. Between Union and Spartanburg there is less damage, but the storm caused considerable loss everywhere.

Georgetown, South Carolina, 10th: Seven houses are reported blown away by the gale at Staple Lake, on the Pedee river.

New Orleans, Louisiana, 9th: At quarantine, the ground was submerged, and the people took refuge in the second story of the Government warehouse. Water from the Gulf was driven over many lower coast rice-fields, and the crops, where not gathered, are entirely destroyed. The amount of damage is estimated at $200,000.

Lynchburg, Virginia, 11th: The rains yesterday and last night caused a great rise in the James river and its tributary streams, overflowing the lowlands and damaging the crops and destroying property. Five hundred feet of trestle, used in extending the dam across the river, was washed away. The Richmond and Alleghany railroad bridge, across the Tye river, was washed away and other damage done along the line.

Boston, Massachusetts, 11th and 12th: The storm of last night was very severe. The rain came down in torrents, and the lightning was very vivid. The steamer "Harlem," on her way to New York, ran upon Great Ledge, off Wood's Holl, and was leaking badly. The schooner "Freeman," was struck by lightning. The brig "James Miller" lost her deck load and boat, had sails split, and sustained other damage.

Yarmouth, Massachusetts, 12th: The schooner "Mary Shields," with a load of lumber, encountered the storm near Cape Cod, and attempted to make Provincetown harbor, but lost jib and had mainsail split, the wind and sea increasing, she drifted ashore and grounded on the bars southeast of Chatham lights.

Eastport, Maine, 14th and 15th: The storm here was the fiercest that has visited this section for many months, and was accompanied by heavy rain. A small schooner loaded with lumber parted her chains, went ashore, and became a total wreck. The lumber was strewn in all directions. The chimney of the express office was blown down, and a number of fences wrecked. The schooner "Elihu Burritt," lying at anchor on the Wolves Bank, dragged her anchor, and to prevent going ashore the cable was cut, losing sixty fathoms of cable and the anchor.

Calais, Maine, 14th: Many shade trees were blown down, chimneys wrecked, and a few buildings suffered considerable damage. Schooner "Jed F. Duran," laden with coal, sank in Passamaquoddy bay. Loss on vessel, $5,000.

Portland, Maine, September 14th: The storm was the severest since last winter, the wind attaining a velocity of 36 miles per hour. Trees and chimneys were blown down, and awnings considerably damaged.

The following telegrams sent or received, arranged chronologically, show the work of this service in furnishing timely storm warnings in advance of this hurricane. The first dispatch was as follows: "Washington, September 5. Observer, Key West; 10:00 a. m. Up signals. Barometer falling rapidly at Havana, and appearances indicate a tropical storm southeast of that station. HAZEN."

At the same time the following warning was sent to the observers at Indianola, Galveston, New Orleans, Mobile, Cedar Keys, Pensacola, and Port Eads: "Signals are ordered up at Key West. Barometer falling rapidly at Havana, and appearances indicate a tropical storm southeast of that station. HAZEN."

At 12:50 p. m., September 5th, the notice below was sent to the observers at Jacksonville, Savannah, Charleston, and also to the press: "Appearances indicate a cyclone southeast of Havana. Its position and course cannot be defined at present. HAZEN."

At 2:45 p. m., the following report was received from the observer of the Signal Service at Jamaica: "Montego Bay, 6:00 a m., September 5, 1882. A storm center is to the westward of this island, moving in a northwesterly direction. The wind here is southerly, blowing fifteen miles per hour, and light rain is now falling."

After receipt of the Jamaica telegram, warnings were sent at 5:35 p. m. to the observers at Charleston, Savannah, Jacksonville, Indianola, Galveston, New Orleans, Port Eads, Cedar Keys, Pensacola, Mobile, and Key West: The tropical storm reported this morning as southeast of Havana is reported this afternoon as west of Jamaica, moving to the northwest. HAZEN.

On the morning of September 6th, a special warning was sent to the Maritime Association, New York, the press, and observers of Philadelphia, Baltimore, Norfolk, Cape Henry, Kittyhawk, Pensacola, New Orleans, Indianola, Brownsville, Delaware Breakwater, Hatteras, Key West, Cedar Keys, Punta Rassa, Mobile, Port Eads, and Galveston: The cyclone referred to in special notice of yesterday is now south of Cuba, moving in a northwesterly direction into the Gulf. Vessels leaving Gulf ports will encounter dangerous winds within the next two or three days. HAZEN.

September 7th, observer at Key West, 9:10 a. m.: Signals down. Cyclone reported south of Cuba has apparently moved in a northwest direction into the Gulf. HAZEN.

This information was also telegraphed to the observers at Indianola, Galveston, New Orleans, Mobile, Cedar Keys, Port Eads, and Pensacola.

September 8th, observers at New Orleans, Port Eads, Mobile, and Pensacola, 9:40 a. m.: Up signals. Appearances indicate a cyclone south of New Orleans, approaching the Gulf coast. HAZEN.

This note accompanying the direction to display warnings was also sent to observers at Cedar Keys, Key West, Indianola, and Galveston.

The telegrams will follow in order as sent.

September 8th, 11:45 a. m., Maritime Association, New York: The indications are that a cyclone, probably the one reported September 5, as south of Cuba, is approaching the Gulf coast near New Orleans. HAZEN.

September 9th, observer at Cedar Keys, 9:30 a. m.: Up signals. Cyclone central near Port Eads, moving in a northeast direction. HAZEN.

September 9th, observers at Indianola, Galveston, New Orleans, Port Eads, Mobile, Key West, and Pensacola: Cyclone central near Port Eads, moving in a northeast direction. HAZEN.

September 9th, Maritime Exchange, New York, observers at Baltimore, Norfolk, Philadelphia, Cape Henry, Kittyhawk, Hatteras, Sandy Hook, Barnegat, Atlantic City, Delaware Breakwater, Chincoteague, Wilmington, Smithville, Fort Macon, Savannah, Charleston, Jacksonville, Cedar Keys, and Key West: The Gulf cyclone has recurved and is now central off the mouth of the Mississippi. Its course cannot be defined at present, but it will probably move northeastward. The shipping on the south Atlantic coast is warned that dangerous winds may be anticipated to-night and to-morrow. HAZEN.

September 9th, observers at Jacksonville, Savannah, and adjacent ports, 5:20 p. m.: Up signals. Cyclone central south of Pensacola, apparently moving in a course a little north of east. HAZEN.

September 9th, observer at New York: Signals are ordered for Jacksonville, Savannah, and adjacent ports. Cyclone central south of Pensacola apparently moving in a course a little north of east. HAZEN.

September 9th, observers at Charleston, Smithville, Wilmington, Fort Macon, Hatteras, 6:10 p. m.: Up signals. Cy-

clone central south of Pensacola, apparently moving in a northeast direction. HAZEN.

September 9th, observer at New York: Signals are ordered up at Charleston, Smithville, Wilmington, Fort Macon, Hatteras. Cyclone central south of Pensacola, apparently moving in a northeast direction. HAZEN.

September 10th, observers at Kittyhawk, Cape Henry, Norfolk, Fort Monroe, Chincoteague, Delaware Breakwater, Cape May, Atlantic City, Barnegat, Sandy Hook, Crisfield, 12:25 a. m.: Up Signals. Cyclone central near Pensacola, moving in a northeast direction. Dangerous winds are anticipated on the Atlantic coast south of New York to-night and to-morrow. HAZEN.

September 10th, observer at New York, 12:25 a. m.: Up signals. Cyclone now central near Pensacola, moving in a northeast direction. Dangerous winds are anticipated on the Atlantic coast south of New York to-night and to-morrow. HAZEN.

September 10th, 12:47 a. m., observers at Eastport, Portland, Boston and adjacent ports, Provincetown, Newport, Block Island, New London, New Haven, Professor Baird, Wood's Holl; Commander Greene, U. S. Navy, Portsmouth, New Hampshire; Maritime Association, New York: The Gulf cyclone has moved in a northeastly course, and is now central south of Pensacola. Dangerous winds are anticipated on the Atlantic coast south of New York to-night and to-morrow, and on the New England coast to-morrow night. HAZEN.

September 10th, observers at New Haven, New London, Block Island, Newport, Provincetown, Point Judith, Boston and adjacent ports, 9:40 a. m.: Up signals. Cyclone central southeast of Atlanta, moving in a northeasterly course. Storm very severe. HAZEN.

September 10th, Professor Carpmael, Toronto, 9:50 a. m.: A severe cyclone is central southeast of Atlanta, Georgia, moving in a northeasterly course. Dangerous winds may be anticipated by to-night on the lakes. HAZEN.

September 10th, observers at Indianola, Galveston, New Orleans, Port Eads, Mobile, Pensacola, 10:30 a. m.: Hoist off-shore signals. Cyclone central southeast of Atlanta, moving in a northeasterly direction. HAZEN.

September 10th, observer at Baltimore, 12:05 p. m.: Up signals. Cyclone central southeast of Atlanta, moving in a northeasterly direction. HAZEN.

September 10th, observers at Oswego and adjacent ports, Rochester, Buffalo, Erie, Cleveland and adjacent ports, Sandusky, Toledo, Detroit and adjacent ports, Port Huron, Alpena, Mackinac City, Grand Haven and adjacent ports, Chicago, Milwaukee and adjacent ports: Cyclone central south of Atlanta, moving in a northeasterly course. Dangerous winds may be anticipated in the lake region to-night. HAZEN.

The note accompanying above telegram was also sent to Escanaba, Marquette, and Duluth.

September 10th, observers at Jacksonville, Savannah and adjacent ports, 5:40 p. m.: Hoist off-shore signals. Cyclone continues to move slowly in a northeasterly direction, and is now central in northern Georgia. HAZEN.

September 10th, 6:00 p. m., observers at Oswego and adjacent ports, Rochester, Buffalo, Erie, Sandusky, Cleveland, Toledo, Detroit, Alpena. Port Huron, Mackinac City, Chicago, Grand Haven, Milwaukee and adjacent ports, Escanaba: The cyclone continues to move slowly in a northeasterly direction, and is now central in northern Georgia. Dangerous winds may be anticipated, especially in the lower lake region, to-night and to-morrow. HAZEN.

September 10th, observers at Eastport, Portland, Boston, and adjacent ports, Provincetown, Newport, Block Island, New London, New Haven, and New York: The cyclone continues to move slowly in a northeasterly direction, and is now central in northern Georgia. Dangerous easterly winds will prevail on the middle Atlantic coast to-night, and may be anticipated on the coast of New England to-night or to-morrow. HAZEN.

September 11th, observers at Indianola, Galveston, New Orleans, and Port Eads, 12:35 a. m.: Signals down. HAZEN.

This information was also sent to the other Gulf ports.

September 11th, 12:45 a. m., Commander S. D. Greene, U. S. steamer "Despatch," Bar Harbor, Maine: The indications are increasing cloudiness and rain, increasing easterly winds, probably dangerous winds by to-night, and falling barometer. Cyclone continues to move slowly in a northeast direction and is now central near Charlotte, North Carolina. HAZEN.

September 11, observers at Cedar Keys, Jacksonville, Savannah, and adjacent ports, Charleston, 9:20 a. m.: Signals down. Storm-centre north of Charlotte, North Carolina. HAZEN.

This information was also telegraphed to observers at Indianola, Galveston, New Orleans, Port Eads, Mobile, Key West, and Pensacola.

September 11th, observers at Mobile, and Pensacola, 9:55 a. m.: Signals down. HAZEN.

September 11th, observers at Portland, Eastport, and adjacent ports, 10:20 a. m.: Up signals. Cyclone central near Charlotte, North Carolina, moving slowly in a northeasterly course. Strong easterly gales anticipated on the New England coast to-day and to-morrow. HAZEN.

This information was also telegraphed to the observer at New York.

September 11th, observers at Smithville, Wilmington, Fort Macon, Hatteras, Kittyhawk, Cape Henry, 5:05 p. m.: Hoist off-shore signals. Cyclone central northeast of Norfolk, moving in a northeast direction. HAZEN.

September 11th, observers at Grand Haven and adjacent ports, Chicago, Milwaukee and adjacent ports, Escanaba, 6:00 p. m.: Signals down. HAZEN.

September 11th, 6:10 p. m., observers at Eastport, Portland and adjacent ports, Boston and adjacent ports, Provincetown: Storm is now central south of Norfolk, moving northeast, unusually severe easterly gales will prevail on the New England coast to-night and to-morrow. HAZEN.

September 12th, observers at Hatteras, Kittyhawk, Cape Henry, 12:05 a. m.: Signals down. HAZEN.

September 12th, observers at Chincoteague, Delaware Breakwater, Cape May, Atlantic City, Barnegat, 12:20 a. m.: Hoist off-shore signals, cyclone now central near Atlantic City, moving in a northeasterly course. HAZEN.

September 12th, observers at Buffalo, Erie, Cleveland and adjacent ports, Sandusky, Toledo, Detroit and adjacent ports, Port Huron, Alpena, Mackinac City, 12:47 a. m.: Signals down. HAZEN.

September 12th, Professor Carpmael, Toronto, 1:00 a. m.: Cyclone central near Atlantic City, moving in a northeasterly course. HAZEN.

September 12th, Commander Greene, U. S. Navy, steamer Despatch, Bar Harbor, Maine: The cyclone is now central near Atlantic City, moving in a northeasterly course. It has been and is very severe on the New Jersey coast. Very severe northeasterly gales will be experienced on the New England coast to-day. HAZEN.

September 12th, observers at New York, New Haven, New London, Block Island, Newport, Provincetown, Boston, Portland and adjacent ports, 9:30 a. m.: Hoist off-shore signals. Storm is now central south of Nova Scotia. HAZEN.

September 12th, observers at Rochester, Oswego and adjacent ports, 10:00 a. m.: Signals down. HAZEN.

September 12th, observers at Wilmington, Smithville, and Fort Macon, 10:02 a. m.: Signals down. HAZEN.

September 12th, observers at Baltimore, Norfolk, 11:55 a. m.: Signals down. HAZEN.

September 12th, observers at Chincoteague, Delaware Breakwater, Cape May, Atlantic City, Barnegat, Sandy Hook, 5:40 p. m.: Signals down. HAZEN.

September 12th, observers at New York, New Haven, New London, Block Island, Newport, Provincetown, Boston and adjacent ports, 5:40 p. m.: Signals down. HAZEN.

September 13, observers at Portland, Eastport and adjacent ports, 12:05 a. m.: Signals down. HAZEN.

As soon as the storm was over, General Hazen telegraphed to all the observers at the Gulf and Atlantic ports, to collect statistics of the values of the vessels and their cargoes that were detained from sailing, by the cautionary signals, warning them of dangerous weather. What losses resulted from the storm are not yet known, but captains who were caught in it say, that it was the worst weather they had ever experienced.

It has been found impossible to secure full and even adequate returns of the vessels detained. The observers at New York, Baltimore, and Philadelphia make no returns, having been unable to secure statistics. The reason given is, that at these ports the harbors are so long, and there are so many safe anchorages toward the sea, that on the approach of a storm all vessels that are ready to sail go to these anchorages, and wait for the clearing off-shore wind. Boston's returns are also inadequate, and it is probable that more good was done coasters than ocean going vessels, the masters of the latter taking more risks owing to the greater size of their ships.

Statistics enough have been obtained, however, to give some idea of the very large amount of property that was prevented from going to sea in the cyclone, or that ran into harbor after seeing the signals. The total amount of the figures sent by the observers is $6,460,586. It is estimated at the signal office that at least $13,000,000 of property and many persons remained safely in harbor on account of the warnings given by the signal office, and that the saving in this one storm pays the expenses of the service for at least ten years.

III.—On the 12th, a depression entered British Columbia and advanced very rapidly to the eastward, moving on the 13th over Manitoba, Dakota, and Minnesota, the centre of low area being charted at the last observation of the day over the western part of Lake Superior. The pressure at Duluth was 29.58, or 0.33 inch below the normal; thus far the depression had exhibited very slight energy, but in the hours from midnight to morning the low area developed into a storm of great violence and pursued, during the day, an easterly track over the Province of Ontario and entered the Saint Lawrence valley. High south to west winds were reported from all the lakes except Lake Superior.

The following newspaper extracts give a description of the disasters caused by this storm in Ontario and New York.

Collingwood, Ontario, 14th: The steamer "Asia" was lost in the storm on Georgian bay, on Thursday, the 14th, and of one hundred passengers on board only two are known to have survived.

Oswego, New York, 14th: The gale was the most severe of the season. The schooner "Louise" foundered at "Deep Hole," near Port Rowan, Ontario; schooner "John T. Mott," with grain, was driven ashore off Hinkley's Point, Wolf Island; schooner "Mystic Star" was dismasted and damaged to the amount of $2,000; schooners "Mary Ann Lyden," "Two Brothers," and "Annie Minnes" were more or less damaged; schooner "T. R. Merritt" had her sails blown away and was damaged about $500; schooner "Plow Boy," laden with wheat, was driven into Pultneyville.

The lowest pressures recorded were: Alpena 29.48, Rockliffe, Canada, 29.19, Montreal 29.29.

On the 15th and 16th, the storm-centre moved to the eastward over Maine and the maritime provinces, but with diminishing energy.

Cautionary signals displayed for this storm were justified by the following maximum velocities:

Alpena 37 w., Port Huron 28 w., Detroit 26 w., Toledo 28 sw., Cleveland 25 w., Erie 34 w., Buffalo 40 s., Rochester 56 w., Oswego 25 w., Eastport 42 se., and off-shore 34 nw.; Portland 36 s., and off-shore 28 nw.; Boston, off-shore 35 nw., Provincetown 32 se., Newport, off-shore 35 w., Block Island 30 s., and off-shore 32 n.; New London 27 s., New York, off-shore 28 nw.; Sandy Hook 37 nw., Barnegat 32 nw., Atlantic City 25 s., Cape May 39 s., and off-shore 32 nw.; Delaware Breakwater, off-shore 28 n., and Chincoteague, off-shore 27 nw.

IV.—On the 22d, there was a sharp fall in pressure on the North Carolina coast, and at midnight there was a well-developed low-area of slight extent west of Hatteras, the lowest barometers along the track being more than 0.25 inch below the mean pressure. On the 23d, the centre of depression moved in a northeasterly track along and near the middle Atlantic coast, when the winds shifted from high southeast to southwest. Cautionary signals displayed along the track of the storm were justified from Fort Macon, North Carolina, to New London, by the following maximum velocities: Fort Macon, 28 sw.; Hatteras, 48 se., and off-shore, 25 n.; Kittyhawk, 28 se.; Cape Henry, 32 e.; Chincoteague, 28 nw.; Delaware Breakwater, 31 nw.; Cape May, off-shore, 40 nw.; Atlantic City, 32 se.; Barnegat, 38 s.; Sandy Hook, 40 n.; New Haven, 25 n.; New London, 28 se.

INTERNATIONAL METEOROLOGY.

International charts iv. and v. accompany the present number of this REVIEW. Chart iv. is published for July, 1880, and continues the series of that chart begun in January, 1877. Chart v. is prepared for October, 1880, and continues the series of that chart begun November, 1877. In the description of these charts, much valuable information has been obtained from the "Monatliche Uebersicht der Witterung," published by Professor Dr. G. Neumayer, Director of the German Marine Observatory at Hamburg, and from the "Bulletin Mensuel," published by Mr. Marc Dechrevens, of Zi-Ka-Wei, China.

Chart iv. exhibits the mean pressure, mean temperature, and the prevailing direction of the wind over the northern hemisphere and at certain isolated stations in the southern hemisphere, as determined from one observation taken each day at 7:35 a. m., or 0:43 p. m. Greenwich mean time.

The lowest mean pressures are shown over British India, the isobar of 29.50 (749.3) occupying the Punjab; southward of that region, the pressure gradually increases, until the isobar of 29.80 (756.9) covers the southern part of the country.

A second area of low-pressure, 29.70 (754.4), occupies Siberia, northeastern Russia, China, and Japan.

The third area, indicated by the isobar of 29.80 (756.9), covers central and southern Russia and Scandinavia. The isobar of 29.90 (759.4) extends from the northern part of North America northeastward over the Atlantic toward Iceland, thence southerly over Ireland, the southern part of England, and over central Europe.

The area of highest pressure, 30.20 (767.1), is found over the Azores, and the isobar of 30.10 (764.5) occupies mid-ocean between the parallels of 40° and 60° north latitude. In the United States, the area of highest mean pressure occupies the Southern states and the north Pacific coast, where the highest pressures were, 30.09 (764.3) and 30.11 (764.8(, respectively.

Compared with the preceding month (June), the mean atmospheric pressure over North America shows no material change, except over the region lying north of the fiftieth parallel. In the United States, a slight decrease, ranging from .01 to .03 inch, occurred over Alabama and Georgia; elsewhere, the pressure remained unchanged. A decrease of .10 inch is shown over Hudson's Bay; in Ontario, there was no change, and over the Gulf of Saint Lawrence, the decrease was very slight.

In Europe, the changes of barometric pressure were very slight, and caused no material change in the positions of the isobars, except over Spain, where the mean pressure was about .05 inch below that of the preceding month. In Greenland, the pressure has decreased .10 of an inch, while an increase of .06 inch is shown over Iceland.

In Asia, the mean pressure over Hindostan ranged from .03 to .10 inch above that for June, and in China, Japan, and Siberia, it was .10 inch below the mean for the preceding month.

Compared with the corresponding month of previous years, the pressure was slightly below the normal along the Atlantic

and Gulf coasts of the United States, and westward to the Rocky mountains, except in Ohio and Illinois, where it was about .04 inch above the normal. In the lake region, the pressure was about .05 inch above the normal. In Canada, the pressure was normal.

The following table shows the mean pressure and mean temperature for the month of July, 1880, in the several countries of Europe and Asia, compared with the means as determined from observations taken during the years 1877, 1878, and 1879:

Countries.	Mean Pressure.			Mean Temperature.		
	July, 1877, 1878 and 1879	July, 1880.	Departure.	July, 1877, 1878 and 1879.	July, 1880.	Departure.
Algeria	30.03	30.04	+0.01	90.1	89.4	− 0.7
Austria	29.89	29.91	+0.02	72.1	79.1	+ 7.0
British Isles	29.91	29.89	−0.02	62.6	63.7	+ 1.1
Denmark	29.78	29.84	+0.06	62.6	65.5	+ 2.9
France	30.02	30.03	+0.01	72.0	75.9	+ 3.9
Germany	29.89	29.95	+0.06	68.1	72.5	+ 4.4
India	29.58	29.56	+0.02	84.8	82.5	− 2.3
Italy	29.96	29.96	normal	80.6	83.8	+ 3.2
Norway	29.74	29.77	+0.03	62.8	61.8	− 1.0
Portugal	30.05*	30.05	normal	81.3*	77.9	− 3.4
Russia	29.75	29.82	+0.07	72.6	75.9	+ 3.3
Spain	30.01*	30.01	normal	80.4*	80.8	+ 0.4
Sweden	29.74	29.81	+0.07	63.6	65.6	+ 2.0

* Mean for two years only.

The accompanying table shows the deviations in pressure and temperature at isolated stations during the month of July, 1880, as compared with the mean of three years:

Comparative Thermometric and Barometric Means, with corresponding Departures.

Station.	Mean Pressure.			Mean Temperature.		
	July, 1877–78–79.	July 1880.	Departure.	July, 1877–78–79.	July, 1880.	Departure.
				°	°	°
San Jose, Costa Rico, C. A				68.1	67.1	− 1.0
Gibraltar	30.00	30.00	normal	77.9	78.8	+ 0.9
Malta, Mediterranean Sea	29.97	29.97	normal	82.5	84.6	+ 2.1
Sandwick Manse, Orkney Islands	29.81	29.85	+0.04	55.5	56.6	+ 1.1
Bridgetown, Barbadoes	29.90	30.03	+0.04	82.4	81.7	− 0.7
Cape Town, Cape Good Hope	30.13	30.24	+0.11	61.1	64.3	+ 3.2
Fort Napier, Native South Africa	30.01	30.12	+0.11	67.5	71.1	+ 3.6
Freetown, Sierra Leone	30.00	29.98	−0.02	80.8	82.7	+ 1.9
Mauritius, Indian Ocean	30.16	30.24	+0.08	71.9	70.0	− 1.9
Melbourne, New South Wales	30.14	30.15	+0.01	48.0	47.7	− 0.3
Nassau, Bahamas	30.04	30.09	+0.05	83.8	85.0	+ 1.2
Godthaab, Greenland	29.80	29.81	+0.01	44.1	46.8	+ 2.7
Stykkisholm, Iceland	29.78	29.93	+0.15	51.5	55.8	+ 4.3
Thorshavn, Faroe Islands	29.76	29.90	+0.14	54.1	54.1	normal
Fort-de-France, Martinique	29.88	30.22	+0.34	80.5	79.5	− 1.0
Zi-Ka-Wei, China	29.73	29.71	−0.02	78.7	75.6	− 3.1
Athens, Greece	29.88	29.89	+0.01	88.3	88.0	− 0.3
Lahore, British	29.48	29.43	normal	97.9	91.4	− 6.5
Cagliari, Sardinia, Italy	29.97	29.98	+0.01	81.6	83.7	+ 2.1
Tokei, Japan	29.88	29.82	−0.06	76.9	73.4	− 3.5
Tromso, Norway	29.75	29.81	+0.06	54.7	52.7	− 2.0
Angra, Azores	30.33	30.23	−0.10	72.5	72.1	− 0.4
Funchal, Maderia Islands	30.15	30.15	normal	71.8	72.9	+ 1.1
Ponta Delgado, Azores	30.33	30.19	−0.14	75.1	73.8	− 1.3
Archangel, Russia	29.69	29.74	+0.05	64.1	63.0	− 1.1
Tiflis, Russia	29.74	29.77	+0.03	89.1	88.9	− 0.2
Astrakhan, Russia	29.79	29.78	−0.01	85.9	85.1	− 0.8
Ekaterinburg, Russia	29.65	29.70	+0.05	71.0	70.9	− 0.1
Nukuss, Tookkistan, Asia	29.72	29.77	+0.05	90.1	88.9	− 1.2
Tashkend, Tookkistan, Asia	29.72	29.65	−0.07	88.1	85.6	− 2.5
Barnaul, Siberia, Asia	29.63	29.69	+0.06	76.5	69.4	− 7.1
Yeniseisk, Siberia, Asia	29.62	29.74	+0.12	72.6	66.6	− 6.0
Pekin, China	29.64	29.71	+0.07	81.2	75.4	− 5.8
Nikolaievsk on the Amoor, Asia				58.2	61.0	+ 2.8
San Juan de Puerto Rico, W. I	30.00	30.09	+0.09	82.9	82.4	− 0.5
Beirut, Turkey in Asia	29.76	29.77	+0.01	89.8	86.4	− 3.4
Mexico, Mexico	30.08	30.10	+0.02	56.0	55.0	− 1.0
Havana, Cuba, W. I	30.03	30.10	+0.07	82.5	81.6	− 0.9
Navassa, W. I	29.94	30.02	+0.08	82.2	80.7	− 1.5
Paramaribo, S. Guiana, S. A	30.03	30.06	+0.03	81.7	82.7	+ 1.0
York Factory, B. A	29.80	29.93	+0.13	53.6	52.5	− 1.1

In the United States the temperature ranged from 0°.5 to 3°.2 below the normal throughout the country, except along the Atlantic coast, where it was normal; in the Canadian maritime provinces it was slightly above the average; in other parts of Canada it was slightly below.

In Europe the temperature was everywhere above the normal, except in Portugal, where it was slightly below the average.

In British India the temperature was slightly below the average; the highest mean, 91°.4 Fahr. (33° Cent.) was reported from Lahore, and the lowest, 68.°8 Fahr. (20°.4 Cent.), occurred at Belgaum.

The following are some of the extreme monthly mean temperatures reported at isolated stations.

Highest.	Degrees.	Lowest.	Degrees.
Tiflis, Russia	88.9	Godthaab, Greenland	46.8
Athens, Greece	88.0	York Factory, British America	52.5
Nassau, Bahamas, W. I	85.0	Tromsoe, Norway	52 7
Malta, Mediterranean Sea	84.6	Thorshavn, Faroe Island	54.1
Freetown, Sierra Leone	82.7	Nikolaievsk on the Amoor, Asia	61.0

The prevailing directions of the wind in the United States were: From the Rocky mountains eastward to the eighty-sixth meridian, generally southerly; in Texas it was southeasterly; along the Atlantic coast and in the lake region, southwesterly; in New England, northwesterly and southerly; in Canada the winds were mostly southwesterly.

In Europe the prevailing direction was westerly over the entire continent, except in the Scandinavian peninsula, where it was northerly in Norway, and westerly and southeasterly in Sweden; in Algeria the prevailing winds were easterly and southerly.

In British India, the winds were mostly southwesterly, except in the region lying between the eightieth and ninetieth meridians, where they were southerly and easterly. In Japan, the winds were southerly.

Over the north Atlantic ocean, from 35° to 50° north latitude and west of the fiftieth meridian, the prevailing winds were southwesterly; east of the above-mentioned meridian, they were northerly and northeasterly, and on the immediate European coasts, they were westerly and northwesterly.

The rainfall of the month was in excess of the average over the British Isles and northwestern Europe; in the United States, it was in excess of the average along the Atlantic coasts and in the Gulf states; elsewhere there was a deficiency. In the Canadian maritime provinces, a deficiency occurred, and in Ontario, it was in excess of the average.

A noteworthy feature of the month was the prevalence of barometric maxima over the north Atlantic ocean and the absence of severe storms. On referring to the chart of storm-tracks for July, 1880, it will be seen that no storm could be traced across the ocean during that month.

Chart v. exhibits the paths of barometric depressions which have been traced from the daily international charts for the month of October, 1880.

The data are charted for each day of the month on the charts accompanying the "International Bulletin" for that day, and from these charts and additional reports, the movements of the centres of barometric minima are traced.

Twenty-seven of the principal storms occurring over the northern hemisphere have thus been traced. Concerning the general distribution of these depressions, the following is given:

Nine appeared over the United States and Canada. Of these, three were tropical storms, which developed south of latitude 30° N.; six storms have been traced from the interior of the country to the Atlantic coast, and three—numbers iii., iv., and vii.—have been traced as continuous storms across the Atlantic ocean and over Europe.

Fourteen depressions are exhibited over Europe; eight of these traversed the northern part of the continent, while six prevailed in the central and western sections. Of the latter, numbers xvii. and xxii., were unusually severe over the British Isles and northern Germany, and caused great damage to shipping on the North sea, and on the Baltic.

Two depressions are traced in eastern Asia, together with the tracks of three typhoons which occurred during the month.

The following brief descriptions are given of the storms first appearing in the United States and Canada:

I.—This area probably developed in the northwest territories of British America on the 1st, and moved in a southeasterly direction towards Lake Superior, where it was central on the

2d, near Duluth. During that day, the depression crossed lakes Michigan and Huron, attended by rain and generally high winds on the lakes; on the 3d, the course changed to the northeastward, and the centre of disturbance moved down the Saint Lawrence valley, causing unsettled and rainy weather in the Canadian maritime provinces. The depression finally disappeared over Labrador on the 4th.

I a.—This was a storm of cyclonic tendency, which probably developed in the tropics during the last days of September. Owing to the absence of regular reports, the path of the centre is only approximately located, but the disturbance was evidently near Bermuda as a severe storm during the first week of October. The following vessels reports indicate the severity of the storm: On the 1st, the bark "Trelawney," in N. 25°, W. 63°, encountered a severe hurricane; same date, in N. 26°, W. 64°, bark "Marianne" has a hurricane from e. to nw., lasting twelve hours. The brig "Princess," three hundred and fifty miles east of Bermuda, was struck by a hurricane and dismasted; s. s. "Wm. Dickinson," in N. 27°, W. 63° 20′, encountered a violent sw. gale, throwing vessel on her beam-ends. The brig "Golden Fleece" reported: October 1st, terrific squalls, with rain, thunder, and lightning; in N. 28° 30′, W. 68° 30′, every sail blown away, vessel thrown on her beam-ends; at 8:00 a. m. of the 2d, the hurricane-centre passed over the ship, barometer 27.60 (701.0); calm for thirty minutes, after which the wind suddenly shifted to sw. and w., and blew with terrific violence for two hours. On the 2d, the bark "T. K. Weldon," in N. 32°, W. 64°, encountered a hurricane from se., veering to wnw., and lasting four hours, had decks swept and vessel hove on her beam-ends. On the 3d, the bark "Mary S. Gibson," in N. 34°, W. 57°, had a hurricane, vessel badly damaged; bark "Matteo," in N. 37°, W. 58°, terrific hurricane, beginning at se. and veering to nw.; tremendous high sea. Reports from numerous vessels within five hundred miles of Bermuda, indicate that the storm raged with great violence until the 6th or 7th, nearly all vessels reporting loss of sails and spars.

II.—This depression appeared near Moose Factory on the 5th, and moved in an east-southeasterly direction down the Saint Lawrence valley. On the 6th, the centre of disturbance was near Father Point; crossing the Gulf of Saint Lawrence during the 6th and 7th, the depression apparently disappeared to the northward of Newfoundland on the latter date.

III.—An area of low-pressure remained nearly stationary over Dakota from the 7th to the 9th, but on the appearance of an area of high barometer on the Pacific coast, the depression moved northeastward on the last-mentioned date and by the 10th, was central near Lake Superior. During the 11th and 12th, the storm moved over Canada, with its centre probably to the north of the stations of observation, the course then changed to the southeastward and on the 13th, the depression passed the southern extremity of Newfoundland. During the 14th and 15th, the disturbance remained central, as a severe storm near the Banks of Newfoundland; the following vessel reports indicate the severity of the storm during these days: 14th, s. s. "Ethiopia," in N. 45° 20′, W. 52° 42′, fresh se. gale, heavy sea; s. s. "Lamperts," off the Banks, severe ne. to nw. gale, lasting twenty-four hours; brig "B. T. Nash," in N. 43°, W. 55°, heavy nw. gale, lost deck load. 15th, schooner "Annie J. Marshall," in N. 45°, W. 50°, hurricane from sse., veering to nw. by e., lasting sixteen hours; s. s. "Ethiopia," in N. 43°, W. 57°, strong nw. to wnw. gale, heavy sea. On the 16th, the storm was central near N. 50°, W. 45°, the s. s. "Hibernian," in N. 49° 30′, W. 45° 08′, reporting barometer 29.05 (737.9), wind ese., force 4, cloudy; s. s. "Indiana," in N. 51° 06′, W. 36° 20′, barometer 29.67 (753.6), wind sse., force 5. On the 17th, the depression, moving in an east-northeasterly course, was probably central south of the fiftieth parallel, and about W. 35°. The s. s. "Hibernian," in N. 50° 22′, W. 39° 22′, reported barometer 29.40 (746.7), wind e., force 2, and the s. s. "Bristol City," in N. 50° 30′, W. 30° 00′, reported heavy sse. gale, lasting twenty-four hours. The storm continued its easterly movement during the 18th and 19th, and on the 20th was central near the mouth of the English Channel, attended by moderate gales and a decided fall in temperature over the British Isles, the minimum temperatures of the month having occurred during the prevalence of this area. The subsequent course of this depression is described as low-area xvii.

IV.—This disturbance developed in the Gulf of Mexico during the 5th or 6th, and passed northeastward, with its centre to the north of Cuba, but at too great a distance to exert any decided influence over that island. On the 8th, the depression was off the Florida peninsula, attended by strong southeasterly gales and very heavy rains along the Atlantic coast. On the 9th, the disturbance, moving northeastward, was central off the North Carolina coast; the bark "Belle Wooster," in N. 33°, W. 76°, reported having encountered a cyclone from se. to n., lasting nine hours, and the schooner "Almeda Willey," in N. 32° 23′, W. 79° 50′, a heavy ssw. gale. During the 9th and 10th, the storm moved eastward toward Bermuda, and the centre was probably to the southward of that island on the last-mentioned date, causing extremely heavy rains and fresh ne. gales. The storm-centre appears to have moved rapidly northeastward, and on the 11th, was in N. 32°, W. 52°; the bark "Adeline Gibbs" reported on that day, in N. 32° 00′, W. 52° 10′, heavy ese. gale; ran into a calm, lasting fifteen minutes, when the wind suddenly shifted to n., blowing with hurricane force for two hours, after which it moderated to a strong gale. On the 12th, the s. s. "Oder," in N. 44° 48′, W. 50° 56′, reported, heavy gale and high sea, "hurricane-centre passing south of us"; on the same day, the s. s. "Republic," in N. 45° 43′, W. 40° 01′, reported, barometer 29.52 (749.8), wind ene., force 8. On the 13th, the disturbance was central near N. 45°, W. 30°, the s. s. "Republic," in N. 47° 31′, W. 34° 01′, reporting, barometer 29.69 (754.1), wind nne., force 5. During the 14th and 15th, the depression appears to have moved northward and gradually filled up, finally disappearing in about N. 55°. Reports from vessels near Bermuda, indicate that a secondary depression gradually developed during the 11th and 12th, and increased in energy until the 15th, as low-area iv. moved eastward.

V.—This depression was first observed in Dakota, and, moving northeastward, was central in Minnesota on the 14th. During that day and the following, the disturbance moved rapidly towards Hudson's Bay, causing high winds on the lakes.

VI.—This disturbance first appeared in Kansas, where it was central on the 15th, with an area of high pressure in its rear, covering Arizona, New Mexico, Utah, Idaho and parts of Dakota and Colorado. The depression developed increased energy as the centre moved eastward, and in Iowa this storm was reported to have been one of the most violent experienced in that state during a period of twenty years. During the 15th the storm-centre moved north-northeastward and on the 16th was in Minnesota, the lowest pressure reported being 28.85 (732.8) at Saint Paul, and the barometric gradient having rapidly increased. Heavy snow occurred in rear of the depression, while equally heavy rains fell in advance of the centre. During the 16th the storm continued with great violence in the lake region, causing much damage to shipping and other property. By the 17th the centre of disturbance had crossed Lake Superior and was in Ontario; during the day it moved eastward, with increasing pressure and attended by occasional high winds and rain and snow squalls. On the 18th the depression passed into Labrador, where it finally disappeared.

VII.—This depression first appeared over the Atlantic ocean, off the North Carolina coast. On the 21st, the schooner "City of Chelsea," in N. 32°, W. 77°, reported heavy ene., veering to nw. gale, with high sea. On the 22d, the storm-centre was north of Cape Hatteras, causing strong gales along the middle Atlantic and New England coasts. The bark "America," in N. 39°, W. 73°, reported heavy ne. gale and high sea during the day; at 7:30 p. m., the wind shifted to nnw., blowing with

hurricane force for two hours. On the 23d, the centre of disturbance was off the New England coast, causing strong gales and heavy rain in the maritime provinces of Canada. The following vessel reports indicate the severity of this storm over the ocean: 22d, the ship "Nevada," in N. 42° 30′, W. 62° 00′, reported high barometer, with moderate breezes and fine weather during the day; toward night a gale suddenly began from se. to sse.; at midnight the wind had increased to hurricane force, lasting twelve hours. The s. s. "Compton," off George's Bank, encountered a sse. gale with heavy rain, afterwards increasing to a violent hurricane. The s. s. "Titania," about two hundred miles east of Halifax, reported fine weather until the 22d; from 10:00 a. m. to 3:00 p. m. of the 23d, experienced tremendous hurricane, moderating at 8:00 p. m.; s. s. "Newnham," in N. 41° 35′, W. 68° 10°, heavy se. gale with high confused sea. On the 24th, the depression was central near the mouth of the Saint Lawrence, attended by high winds and heavy rain; crossing the Gulf of Saint Lawrence and Newfoundland on the 24th, the storm-centre reached the fiftieth meridian on the 25th. On the 26th, the s. s. "Germania," in N. 47°, W. 45°, reported moderate e. gale with rain, and the s. s. "Allemania" in N. 47°, W. 36°, reported strong ene. gale. During the 26th and 27th, a large area of low barometer covered mid-ocean, between N. 40° and N. 50°; and the centre of lowest pressure appears to have moved rapidly towards the European coasts, attended by strong easterly gales in the northern quadrants. On the 28th, the disturbance appeared off the southwest coast of England, as a very violent and destructive storm, and is hereafter described as low area xxii.

VIII.—This depression appeared in Dakota on the 25th; during the day the centre moved eastward to the lake region. Crossing Lakes Huron and Michigan, the disturbance was central in Ontario on the 26th; passing thence eastward, the depression moved over the maritime provinces, causing rain and snow along the Saint Lawrence. On the 27th, the disturbance moved eastward with decreasing energy and appears to have dissipated over the ocean. The s. s. "Mosel," in N. 42°, W. 59°, reported fresh nnw. to n. gale and high sea, on the 27th.

IX.—This storm developed in the tropics and was central in the Gulf of Mexico on the 28th. On the 29th, the centre of disturbance was in Alabama, attended by high winds and heavy rains throughout the Atlantic coast districts. On the 30th, the depression moved northeastward in a line parallel to the coast, and on the 31st was central in northern Maine. Strong gales and heavy rain occurred in the Canadian maritime provinces, as the centre moved toward the Saint Lawrence.

The following descriptions are given of the storm appearing over Europe:

X.—This is a continuation of low-area xxi. of the September chart. Moving southeastward from northern Norway, the depression was central near the White sea on the 1st. On the 2d, the storm moved to the northeastward of Archangel and disappeared in the Arctic regions.

XI.—This depression developed over the northern part of the North sea on the 1st, and moved over southern Sweden on the 2d, causing cloudy weather and rain and a fall in temperature over the northern part of the British Isles and Denmark. On the 3d, the disturbance crossed the Baltic, where it was central on the 4th; on the 5th, it moved over Russia, and continued its easterly course until the 7th, when it disappeared in the valley of the Obi.

XII.—This is a continuation of low area viii. of the September chart; central as a severe storm over the Azores on October 1st, the depression moved slowly northeastward during the 2d, 3d, and 4th, and was central over the Bay of Biscay on the latter date. On the 5th the disturbance moved over the English Channel, attended by rain near the centre, and cold northeasterly gales in the northern quadrants. On the 6th the depression appeared central over the North sea; moving eastward, the disturbance was near the eastern shore of the Baltic on the 7th, the pressure in rear of the disturbance increasing very slowly. On the 8th the centre was in Russia, and on the 9th it moved eastward into Siberia, barometer at Ekaterinburg reading 29.58 (751.4), calm; raining. During the 10th and 11th the depression continued its easterly movement and disappeared in northeastern Siberia on the 12th.

XIII.—This depression appeared off the northwestern coast of France on the 7th, and moved slowly toward the channel during the 8th and 9th. During these days, there was a general increase of pressure to the north and south of the centre of disturbance, thereby causing steep gradients over the British Isles. Strong easterly to northeasly gales occurred in the channel and unusually heavy rains fell in the southern and eastern parts of England. The depression appears to have remained nearly stationary over northwestern France from the 8th to the 10th; on the 11th, the centre of disturbance apparently moved southeastward through France, with rapidly increasing pressure in its rear. On the 12th, the depression was shown in Italy; on the 13th, the course changed to the northeastward and the disturbance moved into Austria, after which it ceased to exist as a depression.

XIV.—This disturbance developed in the west of Greenland on the 8th, and moved eastward during the 9th and 10th, on which date the centre appeared near Iceland, barometer at Stykkisholm reading 29.53 (750.0). The depression moved rapidly eastward, and on the 11th was central off the northern part of Norway; on the 12th, the area moved over Lapland and the White sea, its course changing slightly to the southward. During the 13th and 14th, the disturbance continued to move by an east-southeasterly course through Russia, and on the 16th, the course changed to northeasterly, and the depression disappeared in the valley of the Obi on the 17th. After the passage of this depression, generally high-pressures prevailed over Greenland throughout the month.

XV.—During the 14th, the pressure decreased in southern Sweden and by the 15th, a well-defined area of low-pressure covered the Baltic, causing westerly to northwesterly gales over the North sea, Norway, and Denmark. Moving eastward, the depression appears to have filled up near the Gulf of Finland on the 16th.

XVI.—This area appeared in northern Scandinavia on the 17th, and moved in a southeasterly course through Sweden, attended by rain and snow over the Gulf of Bothnia. On the 18th, the centre of disturbance was in southern Sweden, attended by generally cloudy weather, and rain or snow and slightly lower pressures over Germany and parts of the British Isles. On the 19th, the disturbance moved northeastward, and disappeared over the Arctic ocean on the 20th.

XVII.—This is a continuation of the storm traced across the Atlantic ocean as low-area iii. of the present chart. Central off the mouth of the English Channel on the 20th, the depression moved northeastwardly, attended by a decided fall in temperature, and rain and snow over the British Isles and northern and western France, and fresh to strong winds in the western quadrants. The fall of snow was unusually large in the southern part of England. The disturbance developed great energy during its passage along the European coasts, from Brest to Memel; during the night of the 20th—21st, the wind reached a velocity of forty to seventy miles per hour, at stations in northern Germany, and along the shores of the Baltic, the lowest pressure, 28.71 (729.3), was reported from Memel on the 21st. Several buildings were damaged and many trees uprooted, while shipping suffered considerably. By the 22d, the disturbance had passed into Russia, with its centre to the northwest of Kasan, barometer at that station, 28.99 (735.4), wind sw. During the 23d and 24th, the storm appears to have followed a northeasterly course towards Siberia, disappearing on the latter date. This was one of the most important storms of the month, and appears from the force and circulation of the winds, to have possessed the characteristics of a tropical hurricane.

XVIII.—This depression appeared central near the Azores on the 20th, and moving northeastward, appeared over the Bay

of Biscay on the 22d, with its centre near Brest, where the pressure was 29.40 (746.7). Heavy rain fell in advance of the centre, over the English channel and northwestern France, accompanied by a general rise in temperature over the districts named. On the 23d, the depression passed eastward into central Germany; moving in an east-southeasterly course through Austria, the depression was shown in Russia on the 24th, with its centre near Nikolaiev. The area then moved northeastward and disappeared in eastern Russia on the 25th.

XIX.—This was a depression which appeared in Sweden on the 24th, and crossed the Gulf of Bothnia, disappearing in Finland on the following day.

XX.—This disturbance developed over the North Sea, north of Scotland, on the 24th, and moved southeastward, causing a rapid fall in barometer over Scotland on the 25th. On the 26th, the disturbance appeared over Denmark, with generally heavy rains and slightly higher temperature over the British Isles, Germany and northern France. On the 27th, the area of low-pressure, having crossed the Baltic, was shown near Saint Petersburg; passing thence northeastward, it disappeared in northeastern Russia on the 28th.

XXI—This was probably a subsidiary depression, which formed off the British coasts on the 26th and 27th, in advance of low area xxii., with which it merged on the 28th.

XXII.—This is a continuation of the tropical hurricane traced across the ocean as low-area vii., and was one of the most disastrous storms ever experienced in Europe. During the 26th and 27th, the barometer remained low and falling over the British Isles and western Europe, and generally unsettled weather prevailed, with a general rise in temperature. On the 28th, a deep depression—28.80 (731.5)—appeared off the southwest coast of England, with unusually heavy rains in England and snow in Scotland. Very heavy northeast to southwest gales prevailed over the British Isles and on the eastern shores of the North sea; on the 29th, the depression moved eastward over the North sea, accompanied by heavy rain and violent northerly and easterly gales and snow in the northern quadrants. On the 30th, the disturbance moved northeastward, with slowly increasing pressure along the shores of the Baltic, and on that day was central near Saint Petersburg, where it remained as an area of low-pressure at the end of the month. After the passage of this depression the pressure quickly recovered over the British Isles, France and Germany, and at the close of the month, an area of high barometer occupied central Europe; northwesterly winds with considerably lower temperature prevailed, and frost was reported throughout England. This storm caused great damage to shipping along the shores of the North sea and Baltic, and the heavy rains caused floods in the inlands counties of England. More than one hundred and sixty vessels were reported to have been wrecked on the British coasts alone, and many lives were lost.

XXIII.—This depression appeared over northern Scandinavia on the 30th, and moving southeastwardly, probably united with the preceding depression, number xxii, forming an area of low pressure which occupied northern Europe at the close of the month.

Of the storms appearing over eastern Asia, the following descriptions are given:

XXIV.—This depression probably developed in northwestern China, on the 23d, and moving slightly south of east, was central near Vladivostock on the 24th, accompanied by strong southeasterly gales, which caused much damage. On the 25th, the depression crossed the sea of Japan, the s. s. "Appin," in N. 39° 06′, E. 131° 12′, reporting, barometer at noon, 29.48 (748.8), sse. force 10, thunder and lightning and heavy rain; at 1.15 p. m., barometer stationary, wind w., force 10. On the 26th, the disturbance crossed the northern part of Niphon and disappeared eastward over the Pacific ocean. Owing to lack of data this is the only storm that appears on the daily international charts of the Signal Service, but Mr Marc Dechrevens, Director of the Zi-Ka-Wei observatory, states that several depressions traversed the northern part of China during the month, and were generally more or less violent during their prevalence.

XXV.—This disturbance first appeared in Tartary on the 4th or 5th, and moving eastward was probably the storm that occured over the Aleutian islands on the 5th. The Signal Service observer at Attou island (N. 52° 38′, E. 172° 30′,) reported that a terrific storm occurred on the 5th, carrying away the anemometer and wind-vane, and unroofing the office building. The storm was accompanied by torrents of rain; barometer (corrected for temperature and instrumental error only) 29.67 (753.6) to 29.15 (740.4). The disturbance probably passed northeastward, causing a rapid fall in the barometer at Sitka, Alaska, during the 5th and 6th, with wind changing to westerly.

XXVI.—There was a decrease of pressure at Fort Saint Michael's, Alaska, on the 25th; and on the 26th and 27th, a sevefe storm prevailed along the Alaskan coast. On the 26th, the barometer at Sitka read 28.78 (731.0), wind se., force 8; several shocks of earthquake were felt during the storm. The s. s. "Princess Alice," near Fort Wrangel, reported: 26th, 2:00 a. m., heavy ese. gale, steamer just making headway; at 6:00 a. m., barometer 29.00 (736.6), heavy squalls; 7:00 a. m., 28.70 (729.0), ship hove-to; 7:30 a. m., 28.60 726.4), heavy rain, with terrific squalls, ship unmanageable; 8:45 a. m., barometer 28.58 (725.9); a little patch of blue sky became visible in the south, and the barometer began to rise, the wind shifting suddenly to south, and the sky clearing. 27th, barometer 29.44 (747.8), snow squalls; 11:00 a. m., southerly gale and heavy rain. The depression probably passed eastward, and was shown over Hudson's Bay on the 28th and 29th.

XXVII.—This is a storm which occurred in the Pacific ocean near N. 15°, W. 120°, during the 2d and 3d. The ship "Lorenzo," in N. 14° 23′, W. 120° 18′, reported: October 2d, encountered a cyclone, beginning at northwest and ending at southeast, lasting twenty-four hours; vessel lost fore and main-topmasts, and a number of sails. The schooner "Sadie F. Caller," in N. 15° 20′, W. 119° 58, reported: October 3d, 8:00 a. m., barometer 30.00 (762.0), wind increasing and weather threatening; 11:30 a. m., strong wnw. gale, very high sea, barometer oscillating between 29.90 (759.4) and 29.80 (756.9); at noon, ship under bare poles, wind hauled more to the westward and freshened to a violent gale, barometer 29.40 (746.7), and falling. At 4:00 p. m., wind blowing with hurricane force from wnw., tremendous sea running, decks swept and bulwarks stove, barometer 29.25 (742.9), and falling rapidly; 4:30 p. m., barometer 29.10 (739.1), and still falling. At 5:00 p. m., it suddenly fell calm, and the weather cleared up for a few minutes, sea very high and ship unmanageable; 5:30 p. m., a heavy sea broke on board, sweeping the decks of every thing movable and damaging the rudder, barometer 28.90 (734.0), falling; at 8:00 p. m., barometer 28.80 (731.5), wind blowing with increased force. At 10:30 p. m., the gale began to abate, and the barometer rose almost simultaneously; at 6:00 a. m. of the 4th, the wind hauled to ese.; moderately fine weather and sea going down fast; barometer 30.26 (768.6).

The following descriptions of the typhoons of October, 1880, are given, supplemented by notes from the "Bulletin Mensuel," published by Mr. Marc Dechrevens, of Zi-Ka-Wei, China.

I.—This was the most destructive typhoon of the season, and great loss of life and property occurred during its passage over Japan. The disturbance was first encountered by the ship "Cilurpum" (which vessel also experienced the typhoon of September 25th–28th) on September 30th, in about N. 30°, E. 131°, wind ne. by e., force 8, (Beaufort scale), high se. sea, barometer falling. On October 1st, the vessel, having lost sails and sustained other damage, appears to have been blown towards the centre; at noon of the 1st, her position was N. 29° 11′, E. 132° 20′, barometer 29.63 (752.6), wind ne., force 10. During the 2d, the wind increased to force 12, and the barometer fell to 27.88 (708.1); at this time, the vessel was on her beam-ends, with sea making a clean breach over her, steer-

ing gear disabled, and masts and sails broken or cut away. On the morning of the 3d, the wind suddenly changed to northwest, and moderated to force 11, barometer rising; during that day and the following, the wind gradually moderated and the barometer rose steadily. The reports of vessels encountering the typhoon were sufficiently numerous and complete, to admit of the accurate tracing of the movement of the centre along the coast of Japan. Owing to lack of space, these reports cannot be given in detail, but all report hurricane winds and very high seas, in which the ships sustained more or less damage. On land, the typhoon was equally disastrous in its effects. The centre passed Tokio at 2:00 a. m. of the 4th (local time); the wind reached a velocity of seventy miles per hour from the northwest, increasing suddenly at 2:00 a. m., to a velocity of one hundred miles per hour. More than 1,000 houses were completely demolished and 2,000 were more or less damaged; twenty-eight persons were killed, and sixty were injured, many seriously. The largest trees were uprooted and all gardens destroyed; at Shiba, the streets were strewn with branches of trees and other debris, and large numbers of birds were killed by the fury of the storm. An immense scaffolding, used in the building of the temple of Hijio-Honto, was blown down, the debris forming a mass more than one hundred feet high. At Yokohama, Kobé and at many villages in the interior, the loss of life and property was very great, many bridges were swept away, and vessels in the harbors dragged their anchors and were driven out to sea. The precipitation attending the typhoon was very heavy, the rainfall at Tokio, amounting to 4.61 inches (117 m. m.) After the passage of the centre over Tokio, the barometer rose rapidly and the typhoon disappeared over the ocean on the 5th. Its progressive movement was about nineteen miles (thirty-five kilométres) per hour; and its diameter, from southwest to northeast, was about one hundred and fifty miles when near Tokio.

II.—This typhoon first appeared to the eastward of Luzon, on the 10th, and moved in a westerly direction towards the coast of China. It entered the China sea by the channel of Bashee, between Luzon and Formosa, on the 12th, and reached the island of Hainan on the 16th, and the Gulf of Tonquin on the 17th. The typhoon was very violent during its passage over the sea, as indicated by the following vessel reports. The ship "James Bailey," which left Hong-Kong on the 14th, reported barometer 29.84 (757.9), wind ne.; at noon of the 15th, the barometer read 29.10 (739.1), wind blowing furiously from the east; at midnight, barometer 28.50 (723.9), wind sw. At 3:00 a. m. of the 16th, the sails were blown from the yards and the wind had increased to a hurricane, and at 4:00 a. m. the foretop-gallant and main-royal masts broke off, and three men were washed overboard. During the next twenty-four hours the wind travelled round the compass, no less than four times, and at 6:00 p. m. of the 17th, the vessel drove ashore on Hainan Sands. The French ship "Taffarette," which left Hong-Kong on the 11th, was also wrecked on Hainan reefs. At 1:00 a. m. of the 16th, a tremendous squall struck the vessel, throwing her on her beam ends, the main-mast was cut away to right the ship, when terrific seas broke on board, sweeping the decks. After the violent squall, it became calm suddenly, the sky was clear above the vessel, but the horizon was covered with dense black clouds, and the sky was brilliantly lighted by the vivid lightning which appeared to start from the zenith. The calm lasted twenty minutes, during which time, the barometer oscillated between 27.87 (718) and 28.74 (730), the calm was followed by a terrific squall from the northwest, which hove the vessel down. On the 19th, the ship was abandoned, being a total wreck. The ship "John A. Briggs" left Hong-Kong on the 10th, and the 13th encountered a hurricane from all points of the compass, and lasting twelve hours, with an intermission of two hours, afterwards fresh ne. winds prevailed.

III.—This typhoon apparently developed on the 24th, the circulation of the winds at Manila indicating that the disturbance was southwest of Luzon on that day. The typhoon moved slowly northward during the 25th, 26th, and 27th; on the 28th, the disturbance was south of Formosa, and on the 29th, it was over the Channel of Bashee, disappearing on the following day to the eastward of Formosa. The lowest barometer reported was at Takao, Formosa, 29.69 (754.0), on the 28th. The only vessel report of this typhoon is the following: 26th, in N. 18° 19′, E. 120° 00′, the ship "Joseph Hayden" encountered typhoon winds from the northeast, with very heavy sea from the north-northeast, lasting three days.

TEMPERATURE OF THE AIR.

The distribution of mean temperature over the United States for the month of September, 1882, is exhibited on chart number ii., by the dotted isothermal lines. The table of mean comparative temperatures in the lower left-hand corner of the chart, shows the average temperature for the month in the several districts, as determined from observations taken at Signal Service stations during the month of September in previous years. The second column shows the mean temperature for the current month; the third column shows the departures of the mean of the current month from the mean of several years. East of the one-hundredth meridian and south of the thirty-seventh parallel of latitude, the temperature ranges from normal in the south Atlantic states to 6°.3 below in the southern slope. West of the one-hundredth meridian and south of the forty-second parallel, the temperature is also below the normal, but the departure is less marked, the range being from 0°.2 in the south Pacific coast region to 2°.8 in the southern plateau district. In the northern sections of the country from the Pacific coast to New England the temperature is generally above the normal, the greatest departure (3°.3) occurring in the extreme northwest; in the Ohio valley, the temperature is normal; on the summit of Mount Washington, 1°.9 above; and on the summit of Pike's Peak, 2°.1 below.

DEVIATIONS FROM MEAN TEMPERATURE.

Under this heading, departures exhibited by the reports, from the regular Signal Service stations, are shown in the table of comparative temperatures, on the left-hand side of chart number ii. The following items of interest, in connection with this subject, are reported by voluntary observers:

Illinois: Riley, mean temperature, 60°.6, or 0°.4 above the September average for the past twenty-one years. Swanwick, mean temperature, 65°.5, or 3° below the September average.

Indiana: Vevay, mean temperature, 69°.12, is about the September average of the past seventeen years. Saint Meinrad, mean temperature, 62°.8, or 0°.5 below the September average of the past seven years. The maximum temperature of the month, 87°, is 3° below the mean maximum temperature, and the minimum, 49°, is 3°.6 above the mean minimum temperature of September for the past seven years.

Iowa: Clinton, mean temperature, 61°.6, is about the September normal.

Kansas: Lawrence, mean temperature, 69°.3, or 3°.17 above the September average of the past fourteen years. During that period, the highest September mean, 70°.59, occurred in 1881; the lowest 62° 37 occurred in 1868. The maximum temperature of the month, (105° on the 12th,) is the highest recorded during the past fourteen years; the next highest maximum temperature, 91°, occurred in 1881. Wellington, mean temperature, 67°.5, or 1°.7 below the average of the past three years. The mean temperature of the ten days from September 11th to 20th, 76°.7, has been exceeded but once during the present year: viz.: from June 21st to 30th, when the mean was 79°.9. Clay Centre, mean temperature, 68°.9, or 1°.6 below the average of the past two years.

Maine: Gardiner, mean temperature, 59°.09, or 0°.51 above the September average of the past forty-six years.

Maryland: Fallston, mean temperature, 66°.27, or 0°.71 above the September average of the past eleven years. During that period, the highest September mean, 74°.55, occurred in 1881; the two lowest, 61°.27 and 61°.28, occurred in 1871 and 1879, respectively.

Table of Comparative Maximum Temperatures for the Month of September.

State or Territory.	Maximum for September, 1882, Signal Service.		Highest since Signal Service stations were opened—3 to 11 years.			Highest from any other source.			
	Station	Temp.	Station.	Temp.	Year.	Place.	Temp.	Year.	Length of Record.
		°		°			°		
Alabama	Mobile	94	Montgomery	97	1875	Mount Vernon Arsenal	98	1860	33 years.
Do						Huntsville	100	1875	1 "
Arizona	Phœnix	109	Burke's and Yuma	113	1879	Fort McDowell	114	1879	14 "
Arkansas	Fort Smith	99	Little Rock	97	1881	Fort Smith	101	1860	21 "
California	Campo, Los Angeles, and Sacramento	100	Red Bluff	106	1877	Fort Miller	114	1853	13 "
Colorado	West Las Animas	94	Denver	93	1878	Fort Lyon	99	'68 & '75	19 "
Connecticut	New Haven	85	New Haven	100	1881	Columbia	94	1856	9 "
Do						New Haven	92	1864	87 "
Dakota	Fort Buford	100	Fort Sully	107	1874	Fort Randall	107	1863	20 "
Do						Fort Sully	106	1874	14 "
Delaware	Delaware Breakwater	86	Delaware Breakwater	93	1881	Fort Delaware	90	1865	44 "
Dist. of Columbia	Washington	92	Washington	104	1881	Washington	95	1838	58 "
Florida	Jacksonville	94	Jacksonville	98	1875	Fort Jefferson	100	1871	12 "
Do						Fort King	100	1833	10 "
Georgia	Savannah	91	Augusta	97	'75 & '81	Oglethorpe Barracks	99	1845	76 "
Idaho	Fort Lapwai	97	Boisé City	96	1878	Fort Boisé	103	1874	16 "
Illinois	Springfield	90	Cairo	97	1881	Manchester	102	1864	10 "
Do						Anna	102	1881	7 "
Indiana	Indianapolis	85	Indianapolis	95	1881	Vevay	100	1881	16 "
Do						Laconia	101	1881	7 "
Indian Territory	Fort Supply	102	Fort Gibson	105	1881	Fort Gibson	103	1834	52 "
Do						Fort Sill	103	1871	10 "
Iowa	Des Moines	92	Keokuk	97	1881	Muscatine	103	1881	7 "
Do						Mount Vernon	99	1874	16 "
Kansas	Leavenworth	101	Dodge City	99	'76'81	Fort Leavenworth	108	1860	50 "
Do						Clay Center	109	1881	1 "
Kentucky	Louisville	88	Louisville	99	1881	Newport Barracks	96	1864?	28 "
Louisiana	Shreveport and Port Eads	93	Shreveport	101	1881	Fort Jesup	100	1824	22 "
Do						Point Pleasant	104	1881	7 "
Maine	Portland	82	Portland	95	1881	Brunswick	96	1825	52 "
Maryland	Baltimore	88	Baltimore	101	1881	Fort Washington	99	1851	37 "
Do						Fallston	102	1881	6 "
Massachusetts	Boston	88	Boston	102	1881	Fort Warren	100	1872	18 "
Michigan	Alpena	88	Detroit and Marquette	97	1874	Thornville	100	1881	3 "
Do			Port Huron	97	1881	Fort Brady	98	1861	57 "
Minnesota	Saint Paul	91	Saint Paul	94	1878	Fort Snelling	92	'38'77'78	60 "
Mississippi	Vicksburg	92	Vicksburg	100	1878	Fayette	98	1881	6 "
Do						Columbus	95	1865	9 "
Missouri	Saint Louis	96	Saint Louis	102	1881	Saint Louis	101	1881	41 "
Do						Jefferson Barracks	99	1864	35 "
Montana	Glendive	101	Fort Keogh	96	1879	Tongue River	103	1877	3 "
Do						Fort Benton	101	1878	11 "
Nebraska	North Platte	96	North Platte	101	1881	Clear Creek	103	1881	7 "
Do						Genoa	103	1881	6 "
Nevada	Winnemucca and Pioche	90	Winnemucca	94	'78 & '80	Fort McDermitt	96	'75 & '79	15 "
New Hampshire	Mount Washington	56	Mount Washington	65	1880	Auburn	95	1881	6 "
Do						Dartmouth College	92	'43 & '45	17 "
New Jersey	Sandy Hook	87	Sandy Hook	101	1881	Alco	104	1881	7 "
New Mexico	Silver City and Fort Bayard	87	La Mesilla	105	1879	Fort Craig	103	'57 & '71	26 "
New York	New York City	89	New York City	100	1880	Penn Yan	102	1881	16 "
Do						Poughkeepsie	100	1849	20 "
North Carolina	Kittyhawk	90	Kittyhawk	95	1880	Fort Johnston	98	1851	54 "
Do			Wilmington	98	'75 & '76				
Ohio	Cleveland	90	Cleveland and Columbus	99	1881	College Hill	102	1881	6 "
Do						Cincinnati	100	1868	35 "
Oregon	Umatilla	94	Umatilla	95	'77 & '79	Fort Haskins	98	1860	9 "
Pennsylvania	Pittsburg	91	Philadelphia and Pittsburg	102	1881	Milton	105	1881	3 "
Do						Flemington	103	1881	3 "
Rhode Island	Newport	83	Newport	88	1881	Fort Adams	96	1881	40 "
South Carolina	Charleston	90	Charleston	94	1876	Fort Moultrie	93	1851	27 "
Do						Aiken	95	1881	3 "
Tennessee	Nashville	90	Memphis and Nashville	98	1881	Ashwood	100	1881	3 "
Texas	Eagle Pass	100	Rio Grande	107	1877	Fort Stockton	109	1873	21 "
Utah	Salt Lake City	89	Salt Lake City	93	1875	Fort Douglas	97	1876	19 "
Vermont	Burlington	82	Burlington	90	'80 & '81	Charlotte	94	1880	7 "
Virginia	Cape Henry	92	Fort Myer	102	1881	Accotink	104	1881	7 "
Washington T'y	Almota	94	Dayton	91	1881	Fort Walla Walla	98	1860	10 "
West Virginia	Morgantown	81	Morgantown	91	1881	Helvetia	94	1881	5 "
Do						Flemington	99	1881	3 "
Wisconsin	La Crosse, Milwaukee, and		Milwaukee	94	1874	Fort Howard	98	'26 & '30	30 "
Do	Madison	85				Edgerton	98	1881	1 "
Wyoming	Fort Washakie	90	Cheyenne	88	1875	Fort Laramie	99	1871	26 "

Missouri: Saint Louis; the Missouri Weather Service reports mean temperature 69°.4, which is about the September normal.

New Hampshire: Contoocookville, mean temperatnre, 64°.2, or 4°.0 above the September average of the past twelve years.

New York: Waterburgh, mean temperature, 60°.8, or about the September mean of the past eleven years. Palermo, mean temperature, 58°.1, or 1° below the September average of the past twenty-nine years, and is 9°.7 below the mean of September, 1881. The lowest September mean temperature, 54°.0, occurred in 1867. North Volney, mean temperature, 60°.89, or about the September average of the past fourteen years. During that period, the highest September mean temperature, 69°.24, occurred in 1881; the lowest, 55°.69, occurred in 1871.

Vermont: Woodstock, mean temperature, 58°.48, or 1°.83 above the September average of the past eleven years. During that period, the highest September mean, 62°.62, occurred in 1881; the lowest, 49°.0, occurred in 1870; the highest maximum temperature, 93°, occurred Septembe r7th, 1881; lowest minimum, 22°, occurred September 22d, 1871.

Virginia: Wytheville, mean temperature, 64°.26, or 1° above the September average of the past eighteen years. The maximum temperature of the month (86°) has been exceeded in but three years during that period, viz: 88° in 1872; 87° in 1880, and 96° in 1881.

West Virginia: Helvetia, mean temperature, 61°.73, or 0°.37 above the September average of the past six years.

HIGH TEMPERATURES.

On the 12th, 13th, and 14th, very hot south to southwest winds prevailed over Kansas and Missouri, during which very high maximum temperatures occurred.

The observer at Leavenworth reports: 12th, at 1:00 p. m., a very hot and extremely dry wind set in from the southwest, causing the thermometer to rise rapidly. At 4:00 p. m., the

maximum temperature (101°) occurred, being the highest recorded during September since the establishment of the signal office at that city. The relative humidity fell to seventeen per cent. This hot wind continued through the remainder of the day and on the 13th and 14th. Vegetation was withered and burned up, and out-door labor was suspended.

Professor Snow, of the University of Kansas, at Lawrence, reports: "The month was chiefly noted for the hot-blast of the 12th, which was repeated with somewhat diminished intensity on the 13th, 14th, and 15th. During these simoons, the air was excessively dry, the relative humidity sinking to seven per cent. on the afternoon of the 12th. The fierce dry heat burned the foliage of trees so that they crumbled to powder at the touch of the hand. The nights following these withering days were comparatively cool, the mercury sinking from 105° on the 12th to 65° on the morning of the 13th; and from 101°5 on the 13th to 66° on the morning of the 14th."

The following note is taken from the "Kansas City Review of Science:" "The hottest September day on record in this vicinity was the 12th, when the mercury reached 104° at Kansas city; 105° at Lawrence, Kansas; 100° at Saint Louis, and about the same at neighboring points, and was accompanied by a fierce, hot wind that scorched vegetation like a flame, and filled the air with clouds of suffocating dust."

At Fort Riley, Kansas, a very hot wind, which was almost suffocating, began on the 12th, at about 11:00 a. m., and continued until 4:00 p. m. At 12:00 m., the thermometer (exposed in the shade) read 103°, and in less than one hour later rose to 108°, and remained at that temperature for about three hours.

Clay Centre, Kansas, 12th: Very hot southwest winds. At 10:00 a. m., the thermometer read 98°; at 12:00 m., 100°; at 12:30 p. m., 104°; at 1:00 p. m., 107°; at 2:00 p. m., 108°; at 2:15 p. m., 110° (highest); at 3.00 p. m., 98°; at 4:00 p. m., 100°. During the prevalence of this hot wind vegetation was completely dried up.

Russell, Kansas 12th and 13th: Very high temperatures; maximum, 104°.

Wellington, Kansas, 12th: Maximum temperature, 101°, is the highest recorded at this place during the past three years.

Clinton, Missouri, 12th: Very hot wind coming directly from the south, began at 9:00 a. m., and continued until 4.30 p. m. The temperature rose rapidly, reaching a maximum of 100°. In some places vegetation was completely parched and dried up.

RANGES OF TEMPERATURE AT SIGNAL SERVICE STATIONS.

The monthly ranges of temperature during September, 1882, having varied from 19° to 71° at stations east of the Rocky mountains, and from 30° to 78° on the Pacific coast. The smallest monthly ranges are: Havana, Cuba, 13°; Key West, 19°; Punta Rassa, 20°; Cedar Keys and Galveston, 23°; Port Eads, Louisiana, 26°; Indianola, Texas, and Block Island, Rhode Island, 27°; Charleston, Fort Macon, Montgomery, Provincetown and Savannah, 28°; Hatteras and Portsmouth, 29°; San Diego and New Orleans, 30°. The largest: Campo, California, 78°; Fort Sully, Dakota, and Glendive, Montana, 71°; Fort Buford, Dakota, 69°; Smithville, Dakota, 68° Fort Bennet, Dakota, and Terry's Landing, Montana, 67°; Tobacco Garden, Dakota, 66°; Fort Lapwai, Idaho, and Fort Washakie, Wyoming, 65°; Deer Lodge, and Fort Keogh, Montana, Eagle Rock, Idaho, Phœnix, Arizona, and Moorhead, Minnesota, 64°; Fort Stevenson and Huron, Dakota, 63°; Bismarck, Dakota, 62°; Colfax, Washington territory, Rapid City, and Yankton, Dakota, and Fort Supply, Indian territory, 61°; Prescott, Arizona, 60°. The greatest daily ranges varied in the different districts as follows:

New England: From 14° at Block Island on the 16th, to 30° at Boston on the 18th.

Middle Atlantic states: From 17° at Barnegat on the 30th, to 28° at Williamsport the 29th.

South Atlantic states: From 16° at Portsmouth on the 2d, to 24° at Augusta on the 14th and at Charlotte on the 15th.

Table of Maximum and Minimum Temperatures for September, 1882.

State or Territory.	Signal Service.			U. S. Army Post Surgeons or Voluntary Observers.		
	Station.	Max.	Min.	Station.	Max.	Min.
		°	°		°	°
Alabama	Mobile	94		Opelika	97	
Do	Montgomery		53	Auburn		52
Do				Calera		30
Arizona	Phœnix	109				
Do	Prescott		30			
Arkansas	Fort Smith	99	51	Madison		33
California	Campo	100	22	Mammoth Tank	118	
Do	Los Angeles	100		Bordeu	115	
Do	Sacramento	100				
Colorado	West Las Animas	94	36	Fort Lyon	100	
Do	Pike's Peak	48	8.5	Fort Garland		19
Connecticut	New Haven	85	44	Southington	90	46
Dakota	Fort Buford	100		Fort Pembina		23
Do	Tobacco Garden		23			
Delaware	Del. Breakwater	86	51			
District of Columbia	Washington	92	44			
Florida	Jacksonville	94		Fort Barrancas	95	49
Do	Pensacola		57	FortBrooke Tampa	95	
Georgia	Savannah	91		Way Cross	100	
Do	Atlanta		52	Madison		48
Idaho	Fort Lapwai	97				
Do	Eagle Rock		28			
Illinois	Springfield	90		Bunker Hill	95	38
Do	Champaign		40	Elmira and Riley		38
Indiana	Indianapolis	85	42	Fort Wayne	90	
Do				Logansport		34
Indian Territory	Fort Supply	102	41			
Iowa	Des Moines	92		Indianola	97	
Do	Davenport		36	Nora Springs		31
Kansas	Leavenworth	101	46	Fort Riley	100	
Do				Russell		40
Kentucky	Louisville	88	48	Bowling Green	88	47
Louisiana	Shreveport	93	53	New Iberia	97	
Do	Port Eads	93		Alexandria, Amite City, and Coushatta		48
Maine	Portland	82	43	Cornish	84	
Do				Orono		33
Maryland	Baltimore	88	48	Emmitsburg		28
Massachusetts	Boston	88		Somerset	89	
Do	Springfield		43	Heath and South Lee		38
Michigan	Alpena	88	36	Coldwater and Lansing	90	
Do	Escanaba and Marquette		36	Otisville		33
Minnesota	St. Paul	91				
Do	Moorhead		24			
Mississippi	Vicksburg	92		Pass Christian	98	
Do	Starkville		50	Waynesborough		40
Missouri	St. Louis	98	46	Clinton and Sedalia	98	
Do	Springfield		46	Corning	98	34
Do				Forts Ellis and Assinaboine		25
Montana	Glendive	101		Lincoln	100	
Do	Fort Missoula		26	Utica		24
Nebraska	North Platte	96	38	Golconda	98	
Do				Boca		20
Nevada	Winnemucca	90	31	Contoocookville	89	
Do	Pioche	90		Grafton		33
New Hampshire	Mt. Washington	56	17	Ateo, New Brunswick and Redington	90	
Do				Pequannock		42
New Jersey	Sandy Hook	87		Deming	98	
Do	Atlantic City and Little Egg Harbor		48	Fort Union		21
Do				West Point	93	
New Mexico	Silver City and Fort Bayard	87		Cooperstown		34
Do	Santa Fé		37	Wadesborough	97	
New York	New York City	89		Murphy		41
Do	Buffalo and Rochester		43	Trimble	91	
North Carolina	Kittyhawk	90		Westerville		41
Do	Sloop Point		50	Fort Klamath	84	14
Ohio	Cleveland	90		Dyberry		32
Do	Toledo		43	Allendale	99	
Oregon	Umatilla	94		Jacksborough		45
Do	Roseburg		35	Erin	98	
Pennsylvania	Pittsburg	91	47	Corinth		41
Rhode Island	Newport	83	50	Waco	100	
South Carolina	Charleston	90	62	Promontory	99	
Do				Colville		26
Tennessee	Nashville	90	48	Woodstock	84	35
Do				Charlotte	84	
Texas	Eagle Pass	100		Accotink	93	
Do	Fort Elliott		40	Snowville		40
Utah	Salt Lake City	89	40			
Do						
Vermont	Burlington	82	40			
Do						
Virginia	Cape Henry	92				
Do	Lynchburg and Chincoteague		52			
Washington Ter	Almota	94				
Do	Colfax		27			
West Virginia	Morgantown	81	45	Helvetia	82	44
Wisconsin	La Crosse	85	42	Neilsville	89	36
Do	Milwaukee	85	42			
Do	Madison	85				
Wyoming	Fort Washakie	90	26	Fort Bridger		23

Florida peninsula: From 16° at Key West on the 11th, to 17° at Punta Rassa on the 2d and 28th and Cedar Keys on the 13th.

East Gulf states: From 16° at New Orleans on the 23d, to 26° at Vicksburg on the 21st and at Montgomery on the 28th.

West Gulf states: From 12° at Galveston on the 12th, to 38° at Fort Smith, Arkansas, on the 2d.

Rio Grande valley: From 34° at Rio Grande City on the 27th, to 37° at Eagle Pass and Uvalde on the 12th.

Ohio valley and Tennessee: From 23° at Morgantown on the 16th and at Cincinnati on the 17th, to 29° at Memphis on the 12th and at Columbus and Pittsburg on the 17th.

Lower lake region: From 21° at Detroit on the 9th and at Sandusky on the 10th, to 37° at Rochester on the 30th.

Upper lake region: From 21° at Mackinac City on the 9th, to 26° at Port Huron on the 16th and at Escanaba on the 22d.

Extreme northwest: From 34° at Saint Vincent on the 1st, to 43° at Fort Stevenson on the 4th.

Upper Mississippi valley: From 20° at Cairo on the 28th, to 34° at Des Moines on the 15th.

Missouri valley: From 26° at Springfield, Missouri, on the 14th, to 48° at Fort Bennett on the 23d.

Northern slope: From 39° at Helena on the 23d, to 52° at Fort Keogh on the 14th.

Middle slope: From 22° at Pike's Peak on the 28th, to 42° at West Las Animas on the 11th.

Southern slope: From 26° at Henrietta on the 12th, to 35° at Fort Concho on the 13th, Fort Davis on the 16th and at Fort Stockton on the 28th.

Southern plateau: From 28° at Fort Grant on the 2d and 20th and 29° at Santa Fé on the 9th, to 49° at Fort Apache on the 21st.

Middle plateau: From 32° at Salt Lake City on the 9th, to 50° at Winnemucca on the 5th.

Northern plateau: From 35° at Lewiston on the 8th, to 49° at Eagle Rock on the 9th, and 53° at Fort Missoula on the 13th.

North Pacific coast region: From 31° at Portland on the 26th, to 40° at Roseburg on the 21st.

Middle Pacific coast region: From 24° at San Francisco on the 20th, to 32° at Sacramento on the 1st.

South Pacific coast region: From 22° at San Diego on the 19th, to 58° at Campo on the 23d.

FROSTS.

The dates of the occurrence of frosts are given below. In the various states where they were general, the dates only are given; in those states where they were reported less frequently and by only a few stations, the names of the places, with the dates of occurrence, are given.

Arizona: Fort Verde and Prescott, 18th; Fort Apache, 19th, 20th.

California: Campo, 18th, 19th, 27th, 30th.

Colorado: 1st to 7th, 8th, 11th, 12th, 17th, 18th, 19th, 22d, 23d, 24th, 27th, 28th, 30th.

Connecticut: Southington, 13th.

Dakota: 20th to 24th, 28th, 30th.

Idaho: At Mission, 6th, 29th; Eagle Rock, 19th to 22d.

Illinois: 22d to 27th.

Indiana: 22d, 23d, 24th.

Iowa: 19th to 24th, 26th, 27th.

Kansas: Clay Centre, 2d, 29th.

Kentucky: Lexington, 22d.

Maine: 13th, 27th, 28th.

Maryland: Baltimore, 29th; Emmittsburg, 28th, 29th; Sandy Springs, 29th; Ocean City, 29th, 30th.

Massachusetts: Westborough, 13th; Williamstown, 30th.

Michigan: 21st to 27th.

Minnesota: 19th to 24th, 30th.

Missouri: 21st, 22d.

Montana: 8th, 19th to 23d, 28th, 29th, 30th.

Nebraska: 2d, 19th to 22d, 29th.

Nevada: Carson City, 4th, 8th, 9th, 20th, 21st. 26th, 27th, 28th; Winnemucca, 26th.

New Hamphire: Grafton, 13th, 24th; New Market, 13th, 28th; Mount Washington, 5th, 12th, 16th. 17th, 26th, 27th; Milan, 12th.

New Jersey: Pequannock, 13th.

New Mexico: Santa Fé, 20th.

New York: 9th, 10th, 13th, 23d to 28th, 30th.

Ohio: Westerville, 23d; Toledo, 24th; New Athens, 4th, frost reported to have occurred in the lowlands.

Oregon: Albany, 16th, 28th; Fort Klamath, 23d; Roseburg, 29th.

Pennsylvania: 13th, 24th, 25th, 28th, 29th, 30th.

Rhode Island: Newport, 13th.

Tennessee: Austin, 24th; Ashwood, 23d, light frost reported to have occurred eight miles west of station.

Utah: Salt Lake City, 20th; Coalville, 20th, 21st.

Vermont: 10th, 13th, 27th, 28th.

Washington territory: Colfax, 7th, 8th, 30th; Dayton, 29th; Bainbridge Island, 28th, 29th.

Wisconsin: 19th to 24th, 26th, 27th.

Wyoming: 1st, 18th to 23d, 28th, 29th.

Frosts injurious to vegetation have been reported as follows:

Cheyenne, Wyoming, 1st: The first killing frost of the season occurred on this date.

Fort Keogh, Montana, 22d: Damaging frost occurred this morning; melons, tomatoes, and other vegetable were seriously injured.

Fort Washakie, Wyoming, and Fort Shaw, Montana, 19th: Killing frost.

Pike's Peak, 18th: The telegraph wires were covered with a coating of frost one inch thick; vegetation killed.

Campo, California, 18th: Very heavy frost; vegetation completely killed; minimum temperature, 22°.

Riley, Illinois, 22d: First frost of season; in the lowlands corn was damaged and melon and pumpkin vines were killed.

Clinton, Iowa: The light frosts of 22d, 23d and 24th caused some damage to the late corn.

Cresco, Iowa, 23d: First killing frost of the season; corn injured.

Nora Springs and Des Moines, Iowa, 23d: Killing frost.

Northport, Michigan, 25th: Corn and vines injured by frost.

Clear Creek, Nebraska, 21st: Heavy frost, injuring corn, and killing vines.

De Soto, Nebraska, 23d: Killing frost.

Grafton, New Hampshire, 13th: Killing frost.

Waterbury, New York, 10th: Frost killing tender vegetation.

Fallsington, Pennsylvania, 13th: Corn and vines killed in lowlands; 30th, damaging frost.

Clinton, Illinois, 24th: Reports from De Witt and adjacent counties state that the recent frosts have proved disastrous to corn, in checking its growth and causing it to mature too early.

Dexter, Illinois, 24th: The recent frosts have ruined corn in this locality.

Urbana, Illinois, 27th: The frosts of the past few nights have done material damage to the corn crop in this and adjoining counties. Half of the crop is matured beyond injury, but the other half, which is generally on the low grounds, has been so injured that it will not mature.

ICE.

The formation of ice has been reported as follows:

Tobacco Garden, Dakota, 23d.

Fort Bennett, Dakota, 23d.

Huron, Dakota, 21st.

Fort Washakie, Wyoming, 19th, ice formed to a thickness of one-fourth of an inch.

Fort Apache, Arizona, 21st.

Dayton, Washington territory, 29th.

Alexandria and Olivet, Dakota, 23d.

Charleston, Illinois, 24th.

Fort Madison, Iowa, 21st, 23d.

Genoa and Clear Creek, Nebraska, 21st.

Factoryville, New York, 30th.

Coalville, Utah, 20th, 21st.

Pagosa Springs, Colorado, 19th, 20th, 21st, 28th

PRECIPITATION.

(Rainfall expressed in inches and hundredths.)

The distribution of rainfall over the United States and Canada, as determined from observations taken at more than six hundred stations, is exhibited on chart number iii. The table on the left-hand corner of this chart shows the average monthly rainfall, determined from the records of Signal Service stations, in the several districts, and the excess or deficiency as compared with the average of many years.

In New England and the middle Atlantic states, very heavy rains fell during the passage of low area iv., from the 22d to 24th, causing large excesses (5.47 and 5.50, respectively) in those districts. In the southern slope, an excess of 1.59 has occurred. Small excesses are reported from the Ohio valley, west Gulf states, northern slope, and middle Pacific coast region. The region of greatest deficiency embraces the upper lake region, the upper Mississippi and Missouri valleys, where they amount to 1.94, 2.57 and 2.15, respectively. In the Rio Grande valley, there has been a deficiency of 1.06. Deficiencies less marked have occurred in the south Atlantic and east Gulf states, Florida, lower lake region, extreme northwest, southern plateau and in the north and south Pacific coast regions. On the summit of Mount Washington, the monthly rainfall was 13.32, or 4.61 in excess of the September average at that station. At Denver and on the summit of Pike's Peak, the monthly rainfalls were 0.06 and 0.39, or 0.91 and 1.93 below the normal, respectively.

DEVIATIONS FROM AVERAGE PRECIPITATION.

Under this heading, departures exhibited by the regular Signal Service stations, are shown in the table of comparative monthly rainfalls, as published in the lower left-hand corner of chart number iii. The following items of interest in connection with this subject are reported by voluntary observers:

Illinois: Riley, monthly rainfall, 2.36, or 1.71 below the September average of the past twenty-one years.

Indiana: Vevay, monthly rainfall, 2.85, or 0.71 below the September average of the past seventeen years.

Iowa: Clinton, monthly rainfall, 1.34, or 1.85 below the September average.

Kansas: Lawrence, monthly rainfall, 1.55, or about one-half of the September average of the past fourteen years. During that period, the largest September rainfall, 6.45, occurred in 1874; the smallest, 1.35, occurred in 1877. Wellington, monthly rainfall, 3.87, or 1.14 below the September average of the past three years. The largest September rainfall, 11.19, occurred in 1881; the smallest, 1.34, occurred in 1880. Yates Centre, monthly rainfall, 1.98, or 2.43 below the September average of the past two years.

Maine: Gardiner, monthly rainfall, 7.00, or 3.78 above the September average of the past forty-six years. The total rainfall for the three months ending September 30th, is 9.94, or 1.02 below the average of the corresponding months of the past forty-six years.

Maryland: Fallston, monthly rainfall, 8.63, or 4.03 above the September average of the past twelve years. During that period, the largest September rainfall, 12.95, occurred in 1876; the smallest, 1.21, occurred in 1881.

Massachusetts: Westborough, monthly rainfall, 8.12, is unusually heavy and has been exceeded in but two months during the past eight years, viz: 8.50 in July, 1876, and 8.79 in March, 1877.

Missouri: Saint Louis, the Missouri Weather Service reports the rainfall for the month to be about 1.00 inch below the normal in central Missouri, while in the southwest and central northern parts of the state there has been an excess.

New Hampshire: Antrim, monthly rainfall, 9.40 or 6.34 above the September average of the past ten years, and the largest monthly precipitation that has occurred during that period. The precipitation for March, 1876, (the next largest) was 8.15, and the largest September rainfall of the past ten years, 6.70, occurred in 1876. Grafton, monthly rainfall, 10.70, or 7.77 above the September average of the past three years. Contoocookville, monthly rainfall, 7.60, or 4.35 above the September average of the past twelve years, and is the largest monthly precipitation that has occurred during that period, with the exception of August, 1878.

New Jersey: Paterson, monthly rainfall, 25.90, is unprecedented in this locality.

New York: Waterburg, monthly rainfall, 1.26 or 1.49 below the September average of the past ten years. North Volney, monthly rainfall, 2.75 or 0.18 below the September average of the past ten years. During that period the largest September rainfall, 4.65, occurred in 1876; the smallest, 1.42, occurred in 1881. Palermo, monthly rainfall, 1.80, or 1.10 below the September average of the past twenty years. During that period the largest September rainfall, 7.30, occurred in 1866; the smallest, 1.00, occurred in 1880.

Vermont: Woodstock, monthly rainfall, 6.77, or 3.48 above the September average of the past fourteen years.

Virginia: Wytheville, the total precipitation from January 1st, to September 30th, 1882, is 45.50, or 12.00 above the average of the same months during a period of seventeen years.

West Virginia: Helvetia, monthly rainfall, 7.04, or 2.98 above the September average of the past six years.

The following table shows the total precipitation for each five years, from 1837 to 1881, inclusive, with the annual averages for the several periods, at New York City:

	Total.	Annual averages.
Precipitation from 1837 to 1841	222.20	44.44
" " 1842 " 1846	193.72	38.74
" " 1847 " 1851	227.92	45.58
" " 1852 " 1856	223.52	44.70
" " 1857 " 1861	240.38	48.08
" " 1862 " 1866	271.85	54.37
" " 1867 " 1871	269.28	53 86
" " 1872 " 1876	199.90	39.98
" " 1877 " 1881	215.57	43.11

The annual extremes, 27.57 and 65.51, occurred in 1836 and 1837, respectively. In 1847, 64.85; and in 1868, 64.03 inches fell. The mean annual precipitation for the forty-six years ending with 1881, is 45.48.

Rainfall at San Francisco, from July, 1849, to June, 1877, inclusive.

	1849.	1850.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	Monthly averages for 28 years.
	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	Amt.	
January	.....	8.34	0.72	0.58	3.92	3.88	3.67	9.40	2.45	4.36	1.28	1.64	2.47	24.36	3.63	1.83	5.14	10.88	5.16	9.50	6.35	3.89	3.07	4.22	2.17	4.85	6.97	6.41	4.36	5.196
February	.....	1.77	0.54	0.14	1.42	8.04	4 77	0.50	8.59	1.83	6.32	0.60	3.72	7.53	3.19	0.00	1.04	2.12	7.20	6.13	3.90	4.78	3.76	6.97	4.24	1.83	0.20	3.96	1.14	3.448
March	.....	4.53	1.94	6.68	4.86	8.51	4.64	1.60	1.62	5.55	3.02	3.99	4.08	2.20	2.06	1.52	0.74	3.04	1.58	6.30	3.14	2.00	1.29	1.64	0.78	3.55	1.08	4.37	0.91	3.115
April	.....	0.46	1.23	0.26	5.37	3.12	5.00	2.94	0.00	1.55	0.27	3.14	0.51	0.73	1.01	1.57	0.94	0.12	2.36	2.31	2.19	1.53	1.93	1.10	0.52	1.04	0.02	1.04	0.25	1.518
May	.....	0.00	0.67	0.32	0.38	0.02	1.88	0.76	0.02	0.34	1.55	2.86	1.00	0.74	0.26	0.78	(.63	1.46	0.00	0.03	0.08	0.20	0.21	0.16	0.01	0.34	0.11	0.18	0.00	0.535
June	.....	0.00	0.00	0.00	0.00	0.08	0.00	0.03	0.12	0.05	0.00	0.09	0.08	0.05	0.00	0.00	0.00	0.04	0.00	0.23	0.02	0.00	0.00	0.02	0.08	0.08	1.01	0.02	0.00	0.071
July	.....	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.05	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.01	.....	0.011
August	.....	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.05	0.16	0.02	0.00	0.00	0.00	0.00	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.15	0.00	0.00	0.02	.....	0.024
September	.....	0.00	0.33	1.03	0.00	0.46	0.15	0.00	0.07	0.00	0.00	0.03	0.00	0.02	0.00	0.03	0.01	0.24	0.11	0.04	0.00	0.12	0.03	0.03	0.14	0.00	0.83	0.00	0.26	.....	0.140
October	.....	3.14	0.00	0.21	0.80	0.12	2.41	0.00	0.45	0.93	2.74	0.05	0.19	0.00	0.40	0.00	0.13	0.26	0.00	0.20	0.15	1.29	0.00	0.11	0.21	0.68	2.73	0.22	0.69	.....	0.647
November	.....	8.66	0.92	2.12	5.31	2.28	0.34	0.67	2.79	3.01	0.69	7.28	0.58	4.10	0.15	2.55	6.68	4.19	3.35	3.41	1.18	1.19	0.43	3.72	2.62	1.31	5.92	6.73	0.23	.....	2.943
December	.....	6.20	1.05	7.10	13.20	2.52	0.81	5.76	3.75	4.14	6.14	1.57	6.16	9.54	2.35	1.80	8.91	0.58	15.16	10.69	4.34	4.31	3.38	16.74	7.25	10.12	0.28	3.08	0.00	.....	5.597
Sums	.....	*18.00	17.40	15.66	27.29	21.17	27.37	26.39	22.31	20.93	23.46	21.39	19.46	25.52	38.51	14.53	21.64	14.06	36.28	30.64	30.17	22.59	16.24	30.86	24.33	20.09	21.45	19.42	17.19	*6.66	‡23.247
MONTHLY MEANS		*3.00	1.45	1.30	2.27	1.76	2.28	2.20	1.86	1.74	1.95	1.78	1.62	2.13	3.21	1.21	1.80	1.18	3.02	2.55	2.51	1.88	1.35	2.57	2.03	1.67	1.79	1.62	1.43	*1.11	†1.937

* Sums and means for six months. ‡ Annual averages for a period of twenty-eight years. † Monthly averages for a period of twenty-eight years.

The above table is based upon data taken from the "Annual Report and Statistics of the Meteorology of Oakland, California," for 1881, published by J. B. Trembly, M. D., and will be found interesting as showing the monthly and annual precipitation with the monthly and annual means for a period of twenty-eight years. During the period covered by the record, the largest annual rainfall, 38.51, occurred in 1862; the smallest, 14.53 and 14.06, occurred in 1863 and 1865, respectively. The largest monthly rainfall, 24.36, occurred in January, 1863. Monthly rainfalls exceeding 10.00 occurred as follows: 13.20, December, 1852; 10.88, January, 1866; 15.16, December, 1866; 10.69, December, 1869; 16.74, December, 1871; and 10.12, December, 1873.

The following table shows the greatest and least numbers of rainy and cloudy days, and percentages of mean relative humidity, as reported from the various districts during the month of September:

Table of rainy and cloudy days and relative humidity for September 1882.

Districts.	Rainy days	Cloudy days.	Relative humidity. *
			Percentages.
New England	From 13 to 19	From 5 to 14	From 72.6 " 84.7.
Middle Atlantic states	" 7 " 17	" 6 " 13	" 73.0 " 82.6.
South Atlantic states	" 7 " 14	" 4 " 11	" 73.4 " 85.1.
Florida peninsula	" 9 " 14	" 1 " 6	" 73.2 " 76.7.
East Gulf states	" 5 " 8	" 2 " 5	" 71.2 " 79.6.
West Gulf states	" 6 " 12	" 1 " 6	" 71.7 " 82.3.
Rio Grande valley	" 1 " 9	" 0 " 6	" 59.4 " 65.3.
Ohio valley and Tennessee	" 4 " 15	" 3 " 9	" 65.0 " 81.0.
Lower lake region	" 8 " 13	" 3 " 8	" 71.5 " 75.6.
Upper lake region	" 5 " 15	" 3 " 11	" 71.1 " 80.1.
Extreme northwest	" 7 " 10	" 5 " 6	" 58.3 " 74.9.
Upper Mississippi valley	" 4 " 10	" 3 " 7	" 67.2 " 79.3
Missouri valley	" 3 " 9	" 1 " 9	" 59.0 " 73.9.
Northern slope	" 1 " 10	" 1 " 12	" 35.2 " 59.7.
Middle slope	" 1 " 13	" 0 " 3	" 39.6 " 78.0.
Southern slope	" 4 " 10	" 2 " 6	" 64.8 " 76.6.
Southern plateau	" 1 " 7	" 0 " 3	" 42.9 " 57.2.
Middle plateau	" 3 " 5	" 2 " 6	" 31.5 " 39.0.
Northern plateau	" 5 " 9	" 4 " 7	" 45.6 " 57.4.
North Pacific coast region	Five	" 2 " 4	" 63.0 " 74.0.
Middle Pacific coast region	" 1 " 2	" 1 " 3	" 59.4 " 81.4.
South Pacific coast region	" 0 " 3	" 0 " 3	" 41.6 " 78.2.

* Relative humidity corrected for altitude.

Table of Excessive, Greatest and Least Monthly Rainfalls.

STATION.	Special Heavy. Date.	Amt.	Duration	Largest Monthly. Amount.	Smallest Monthly. STATION.	Amt.
Alabama.					*Alabama.*	
Troy	7, 8	9.34		10.25	Tuscaloosa	0.05
Auburn				7.92	Talladega	0.31
Mobile	8, 9	3.87			Calera	0.32
Montgomery	9, 10	3.49			*Arizona.*	
Connecticut.					Casa Grande	0.00
New Haven	11, 12	4.28		13.43	Maricopa	0.00
Do	21 to 24	7.13			Pantano	0.00
Southington				10.13	Yuma	0.04
New London	11, 12	4.93		8.99	San Simon	0.26
District of Columbia.					Camp Thomas	0.28
Washington				7.84	Tucson	0.32
Florida.					*Arkansas.*	
Fort Barrancas	8, 9	7.35	27 hrs.	11.82	Brinkley	0.19
Cedar Keys	9	6.07		9.37	*California.*	
Pensacola	9	4.87		8.40	Anaheim	0.00
Mayport	8, 9	3.30		8.32	Borden	0.00
Saint Augustine	8, 9	3.66	13hr.30m.	7.98	Caliente	0.00
Key West				6.16	Colton	0.00
Georgia.					Indio	0.00
Smithville	8 to 10	8.04		8.79	Keene	0.00
Macon	10	6.50		8.18	Lemoore	0.00
Milan	7	4.32		8.00	Mammoth Tank	0.00
Allapaha	9, 10	6.98		7.69	Martinez	0.00
Savannah				7.42	Mojave	0.00
Eastman	9, 10	4.57		6.50	Newhall	0.00
Thomasville	9, 10	3.98		6.37	Pajaro	0.00
Jesup	8, 9, 10	4.25		9.13	San Fernando	0.00
Madison	10	5.34			Spadra	0.00
Athens	10	4.40			Solidad	0.00
Fort Gaines	10	3.73			South Valejo	0.00
Columbus	9, 10	3.60			Suisun	0.00
Griffin	10	3.59			Sumner	0.00
Union Point	10	3.49			Tehachapi	0.00
West Point	10	3.43			Whitewater	0.00
Covington	10	3.30			Willows	0.00
Noonan	10	3.04			Los Angeles	t'ce
Calhoun	10	2.87			San Diego	0.01
Indian Territory.					Campo	0.02
Fort Sill	6	2.47			Brentwood	0.02
Louisiana.					Byron	0.02
Port Eads	8, 9	5.90		6.80	Rockland	0.03
Maine.					Poway	0.04
Cornish	23, 24	3.90		8.04	San José	0.04

Table of Excessive, Greatest and Least Monthly Rainfalls—Continued.

STATION.	Special Heavy. Date.	Amt.	Duration	Largest Monthly. Amount, Inches.	Smallest Monthly. STATION.	Amt.
Fort Preble	5	2.90		7.78	Delano	0.05
Portland	23, 24	4.20		7.58	Galt	0.05
Gardiner				7.00	Ione	0.06
Dexter	24	2.60		6.49	Tehama	0.08
Oroao				6.44	Turlock	0.11
Maryland.					Antioch	0.13
Fort McHenry	22, 23	2.87		9.88	Oakland	0.14
Baltimore				9.38	Tuohey's Ranche	0.16
Fallston				8.63	Princeton	0.18
Woodstock	10	2.70	7hrs.15m.	8.44	San Mateo	0.18
Owing's Mills				6.41	Alcatraz Island	0.19
Emmittsburg	10, 11	3.00			Tracy	0.20
Massachusetts.					Williams	0.20
Springfield	21 to 24	8.63		12.73	Cape Mendocino	0.21
Amherst	21 to 24	7.79		11.85	Monterey	0.22
Boston	21 to 23	5.28		10.93	Menlo Park	0.23
Menden				10.70	Angel Island	0.25
South Lee				10.08	Kingsburg	0.25
Milton	11, 12	3.35		10.05	San Francisco	0.26
Do	21 to 23	4.54			Brighton	0.28
Charlestown	11, 12	3.09	25 hrs.	9.95	Tulare	0.29
Princeton				9.85	Farmington	0.30
Rowe	21 to 23	5.45		9.70	Benetia Barracks	0.32
Fort Warren	23	3.24		9.14	Fresno	0.34
Westborough	11, 12	3.15	21hr.30m.	8.12	Livermore	0.34
Do	20 to 24	4.01			Petaluma	0.35
Fall River	11, 12	3.45		7.50	Stockton	0.35
Williamstown				7.04	Point San Jose	0.36
Somerset				7.03	Presidio	0.36
Provincetown				6.39	Salinas City	0.38
New Bedford				6.26	Colfax	0.40
Michigan.					Dunnigan	0.42
Northport	18, 19	2.35	18 hrs.	8.37	Niles	0.44
Marquette	14	2.32	3hrs.15m.		Hollister	0.45
Missouri.					Fort Bidwell	0.48
Protem	1	2.96			*Colorado.*	
Montana.					West Las Animas	t'ce
Fort Shaw	17, 18	3.46			Denver	0.06
New Hampshire.					Pike's Peak	0.39
Mount Washington	14, 15	5.08		13.32	Fort Garland	0.42
Do	21 to 24	5.13			*Dakota.*	
Grafton	21 to 24	5.28		10.70	Yankton	0.07
Auburn	21 to 24	6.09		10.09	Fort Meade	0.26
Bristol	23	2.70		9.87	Wicklow	0.27
Antrim	21 to 24	5.08		9.40	Fort Totten	0.35
Ashland	23	2.70		8.85	Fort Sisseton	0.36
Wier's Bridge	21 to 24	4.78		8.09	Olivet	0.37
Lake Village	21 to 24	4.79		7.88	Fort Hale	0.50
Woodstock	21 to 24	3.39		7.78	Fort Randall	0.50
New Market				7.72	Rapid City	0.50
Contoocookville				7.60	*Idaho.*	
Wolfboro	24	2.60		7.42	Cœur d'Alene	0.08
Belmont	24	3.10		7.35	*Indiana.*	
New Jersey.					Logansport	0.24
Paterson	21 to 23	17.90	69 hrs.	25.98	Lafayette	0.30
Barnegat	11, 12	9.52		14.65	Wabash	0.39
South Orange	23, 23	7.50	13 hrs.	14.45	*Iowa.*	
Do	20 to 24	11.02			Dana	0.07
Atco	11, 12	4.98		13.65	Des Moines	0.15
Do	21 to 23	5.45			Logan	0.20
Bordentown	22, 23	7.35		13.15	*Michigan.*	
Pequannock	21 to 24	9.94		12.89	Battle Creek	0.38
Vineland	10, 11, 12	6.06	32 hrs.	12.35	*Minnesota.*	
Do	21 to 26	6.09			Minneapolis	0.15
Rendington	21 to 23	9.00		12.30	Saint Paul	0.27
Moorestown	22, 23	6.98		11.71	Northfield	0.45
Freehold	22, 23	6.45		11.61	Fort Snelling	0.47
Sandy Hook	11, 12	4.77		11.48	*Mississippi.*	
Do	21, 22	4.37			Waynesborough	0.18
Somerville	22, 23	7.69		11.05	Okolona	0.21
Little Egg Harbor	11, 12	4.07		7.15	*Missouri.*	
Cape May	11	4.85		7.05	Phelps City	0.15
Phillipsburgh	21 to 23	4.57		6.58	Corning	0.40
Atlantic City	11	3.21			*Nebraska.*	
New York.					Lincoln	0.25
Fort Columbus	11, 12	3.93		15.43	North Platte	0.28
Do	21 to 24	9.60			Fremont	0.37
New York City	11, 12	3.38		14.51	De Soto	0.38
Do	22, 23	7.86			Clear Creek	0.47
West Point	22, 23	9.30		13.90	*Nevada.*	
Flushing	23, 24	5.27		11.71	Boca	0.00
Ardenia	20 to 23	8.10			Reno	0.00
Fort Hamilton	20 to 24	5.04		9.97	Toano	0.00
White Plains	23	3.35	21 hrs.	9.75	Wadsworth	0.00
Albany	22, 23	4.16		7.79	Elko	0.03
Port Jervis	22, 23	3.99		6.97	Humboldt	0.25
North Carolina.					Otega	0.25
Portsmouth				8.97	Wells	0.28
Lenoir				8.40	Halleck	0.34
Kittyhawk	26	3.40		7.91	Carson City	0.40
Hatteras				7.67	Hot Springs	0.44
New River Inlet				7.00	*New Mexico.*	
Fort Macon				6.83	Lordsburg	0.00
Weldon				6.62	Deming	0.32
Charlotte	10	3.64			*Oregon*	
Pennsylvania.					Albany	0.41
Fallsington	20 to 24	8.96		12.35	*Texas.*	
Philadelphia	21 to 23	10.09		12.09	Long View	0.03
West Chester	22, 23	4.55		7.23	Corsicana	0.14
Erie	21, 22	3.67			Rio Grande City	0.28
Rhode Island.					El Paso	0.40
Newport	11	2.87		6.57	Eagle Pass	0.46
South Carolina.					*Utah.*	
Saint Mathews	4	3.38		7.00	Terrace	0.00
Charleston	22	1.00	58 m.		Ogden	0.27

Table of Excessive, Greatest and Least Monthly Rainfalls.—Continued.

STATION.	Special Heavy.			Largest Monthly.	Smallest Monthly.	
	Date.	Amt.	Duration	Amount.	STATION.	Amt.
Tennessee.					Salt Lake City	0.37
Chattanooga	8	1.10	1hr.30m.		*Washington territory.*	
Texas.					Almota	0.08
Denison				9.04	Fort Townsend	0.16
San Antonio	6	6.20		8.95	*Wisconsin.*	
Waco				7.67	Franklin	0.06
Sour Lake	15, 16	6.10		7.58	*Wyoming.*	
Fort Stockton	4, 5	6.56		6.81	Cheyenne	0.35
Indianola	6	4.05		6.13	Fort Bridger	0.40
Jacksboro				6.04	Fort Washakie	0.46
Huntsville	6, 7	3.11				
Fort Concho	4, 5	3.05	19 hrs.			
Luling	7	2.64				
Camp near Presidio	4, 5	2.68	24 hrs.			
Fort Elliott	27	1.17	40 m.			
Vermont.						
Charlotte				7.50		
Newport				7.22		
Woodstock				6.47		
Stratford				6.30		
Virginia.						
Lynchburg	26, 27	3.44		8.87		
Norfolk	25, 26	4.85		8.07		
Variety Mills	10, 11	2.72		7.18		
Cape Henry	25, 26	3.95				
West Virginia.						
Morgantown				7.23		
Helvetia				7.04		

HAIL.

Lancaster, Pennsylvania, 9th: A most destructive rain and hail storm passed over the southwest section of this county last night. Fields of tobacco ready for cutting were practically ruined, and the leaf can now only be used for fillings. It is estimated that the amount of damage caused will be considerably more than $50,000. The corn crop also sustained some damage.

Springfield, Massachusetts, 8th: Severe storms, accompanied by hail, visited South Deerfield, Whateley and Sunderland, during the afternoon, doing an immense amount of damage to the unharvested tobacco crop. It is estimated that the damage in each of the towns will be about $15,000.

Anna, Illinois, 29th: Hail storm of considerable severity occurred about ten miles west of this place; many of the hailstones remained on the ground until the following day. No serious damage resulted.

Hillsdale, Michigan, 17th: Hail of considerable size fell a few miles south of this place, damaging corn to some extent.

Hail was also reported by the following stations:

Mount Washington, New Hampshire, 11th.
Morgantown, West Virginia, 21st.
Oswego, New York, 19th.
Milwaukee, Wisconsin, 9th.
Alpena, Michigan, 17th.
Deadwood, Dakota, 21st.
Fort Benton, Montana, 28th.
Fort Supply, Indian territory, 27th.
Fort Elliott, Texas, 27th.
Winnemucca, Nevada, 16th.
Mission, Idaho, 11th, 24th.
Fort Bidwell, California, 30th.
Creswell, Kansas, 27th.
Wellington, Kansas, 27th.
Russell, Kansas, 27th.
Charlestown, Massachusetts, 8th.
Clinton, Missouri, 28th.
College Hill, Ohio, 8th.
Dyberry, Pennsylvania, 8th.
Meadville, Pennsylvania, 19th.

SNOW.

Snow fell at the various stations during the month as follows:

Fort Stevenson, Dakota, 30th: Scattering snow-flakes fell with rain from 10:00 a. m. to 12:00 m.

Fort Washakie, Wyoming, 18th: Heavy snow fell on the mountains near station, during the day; 29th, light snow fell from 1:00 to 7:00 a. m.

New Chicago, Montana, 28th: Light snow fell at intervals during the morning.

Deer Lodge, Montana, 28th.

Pioche, Nevada, 16th: Large snow-flakes fell, with rain, during the day; 17th, light snow from 9:40 to 10:30 a. m.

Eagle Rock, Idaho, 17th: Mountains and foot-hills covered with snow.

Emigrant Gap, California, 16th: Snow has fallen to a depth of four inches.

Reno, Nevada, 16th: The first snow of the season fell in the mountains, eight miles southwest of station, last night.

Fort Shaw, Montana, 29th.
Fort Ellis, Montana, 19th, 27th.
Fort Assinniboine, Montana, 28th.
Helena, Montana, 29th.
Pike's Peak, Colorado, 1st, 2d, 4th, 5th, 7th, 11th, 19th, 22d, 26th, 27th.
Fort Lapwai, Idaho, 29th.
Fort Buford, Dakota, 30th.
Fort Maginnis, Montana, 18th, 28th, 29th.
Fort Bridger, Wyoming, 17th, 26th.
Fort Klamath, Oregon, 30th.
Mount Washington, New Hampshire, 29th.
Tobacco Garden, Dakota, 30th.

SLEET.

Fort Shaw, Montana, 28th.
Pike's Peak, Colorado, 1st, 2d.
Santa Fé, New Mexico, 4th.

COTTON REGION REPORTS.

The following table shows the average rainfall, mean of maximum and mean of minimum temperatures, for the month of September, 1882, in each of the cotton districts as shown on chart vi., issued with the April REVIEW.

Meteorological Record for the Cotton Districts for the month of September, 1882.

DISTRICTS.	Average rainfall in inches.	Mean of the maximum.	Mean of the minimum.
New Orleans	2.64	86.7	67.7
Savannah	4.94	87.1	67.2
Charleston	4.73	84.8	64.9
Atlanta	3.15	82.3	62.3
Wilmington	3.49	81.7	62.8
Memphis	1.69	82.7	60.3
Galveston	3.50	86.8	64.8
Vicksburg	1.73	85.3	61.7
Montgomery	3.10	84.3	62.0
Augusta	4.43	83.9	64.4
Little Rock	2.32	83.3	59.0
Mobile	1.39	86.4	62.8

WINDS.

The prevailing direction of the winds during the month of September, 1882, at Signal Service stations are shown on chart number ii., by arrows flying with the wind. It will be seen from the chart that the prevailing winds along the Atlantic coast were mostly from the north and northeast; in the lower lake region they were from the northeast and east, except southwest at Toledo; in the Ohio valley, Tennessee and the Gulf states, from northwest to northeast; in the upper Mississippi and Missouri valleys, from the south and southeast; they were variable in the Rocky mountain regions; and on the Pacific coast, from north to west.

TOTAL MOVEMENTS OF THE AIR.

[*In miles.*]

The following are the largest total movements at the Signal Service stations: On the summit of Mount Washington, 21,771; Block Island, Rhode Island, 12,011; Sandy Hook, 11,971; Hatteras, North Carolina, 11,622; Kittyhawk, North Carolina, 11,193; Barnegat, New Jersey, 11,140; Portsmouth, North Carolina, 11,023; Cape May, New Jersey, 9,968; Cape Henry, Virginia, 9,292; Cape Mendocino, California, 9,225; Galveston, Texas, 9,153; Indianola, Texas, 9,151; Port Eads, Louisiana, 8,936; Sandusky, Ohio, 8,575; Fort Macon, North Carolina, 8,540; Moorhead, Minnesota, 8,351; Pike's Peak, Colo-

rado, 8,347. The smallest are: Silver City, New Mexico, 1,584; Lynchburg, Virginia, 1,780; Lewiston, Idaho, 1,904; Roseburg, Oregon, 1,915; Williamsport, Pennsylvania, 2,447; Augusta, Georgia. 2,467; Morgantown, West Virginia, 2,491; Montgomery, Alabama, 2,495; Little Rock, Arkansas, 2,542; Uvalde, Texas, 2,620; Portland, Oregon, 2,653; Fort Smith, Arkansas, 2,720; Fort Missoula, Montana, 2,820; Yankton, Dakota, 2,930; Washington, District of Columbia, 2,994; El Paso, Texas, 2,999.

HIGH WINDS.

Maximum velocities of fifty miles per hour, or more, have been reported during the month as follows: On the summit of Mount Washington, 65, nw., 12th; 57, nw., 13th; 85, s., 14th; 96, nw., 15th; 85, nw., 16th; 113, nw., (maximum of month) 17th; 76, nw., 18th; 74, nw., 19th; 70, nw., 20th; 83, s., 22d; 53, sw., 23d; 52. e., 28th, and 52, ne., 29th. Port Eads, Louisiana, 92, ne., 9th; Rochester, 56, n., 14th; Block Island, Rhode Island, 56, ne., 28th and 29th; Delaware Breakwater, 56, n., 20th; Cedar Keys, Florida, 50, s., 9th, and 54, s., 10th; North Platte, 52, se., 15th; Pike's Peak, Colorado, 52, s., 2d; Kittyhawk, North Carolina, 51, ne., 28th; Pensacola, 50, n., 9th; Barnegat, New Jersey, 50, 2d., 12th.

LOCAL STORMS.

Alabama: A violent wind storm occurred at Auburn on the 10th; many trees and several small buildings were blown down, and much fencing was destroyed. The gale continued with unabated force for five or six hours.

Connecticut: 14th. A tornado struck the town of Winsted, Litchfield county, causing serious injury to several persons and great damage to property. Ten houses and five barns were completely destroyed, and the largest trees were uprooted or twisted off. The tornado apparently formed over Long Lake about twelve miles west of Winsted, and followed a course from west to east. Its path was about fifty yards wide and two miles long. Twenty persons were more or less injured, and the damage to property amounted to $20,000 At Bloomfield, Hartford county, three barns were blown down, and others were unroofed.

Florida: 9th. During the cyclone of the 9th, the Presbyterian church, at Freeport, Walton county, was blown from its blocks and twisted, and several mills and other buildings were blown down. At Quincy, Gadsen county, many out-houses, trees, and fences were prostrated, and five persons were killed. At Madison, Madison county, much damage was done to property and trees. The cotton crop was nearly ruined in some places. At Tallahassee, several buildings were unroofed and a church was badly damaged. Trees, fences, and out-houses were blown down. A tornado occurred at Archer, Alachua county, at about 9:00 p. m. of the 9th; several houses were leveled to the ground, others unroofed, and the largest forest trees were uprooted, or twisted off. The track of the tornado was about two hundred yards wide and three miles in length; its course was from southwest to northeast. The cloud had a zigzag motion and struck the ground only at intervals; it was accompanied by a noise resembling distant thunder, and its gyratory motion was from right to left. A tornado occurred at Darbyville, Baker county, at 10:50 p. m. of the 10th, causing great destruction. A section house and adjoining buildings were blown to pieces, the inmates sustaining more or less injury from flying debris; large trees were uprooted, and numbers of cattle and hogs were killed. The tornado cloud was pear-shaped in appearance; it ascended and descended at intervals and was of a luminous red and yellow light.

Georgia: 10th. A violent gale prevailed for four hours at Forsyth on the morning of the 10th. Large numbers of fruit and forest trees were uprooted, and much fencing was demolished.

Kansas: 19th. During a high wind which occurred at Yates Centre, a frame building was blown down and others were damaged. The storm was destructive for several miles northwest and northeast of station. On the 27th, a severe storm passed over the southern part of the town of Newton, Harvey county. A church was demolished, but no other damage was reported.

North Carolina: 14th. A tornado occurred at Sugar Creek Church, about four miles from Charlotte, at about 4:00 p. m. The tornado appears to have formed at the edge of a wood, through which it passed, twisting off the limbs of the largest trees, and uprooting many others. It left a path as clearly indicated as if done by the woodman's axe, and in every instance the trees appeared to have been twisted off. The barns of a farm in the track of the tornado, were unroofed and the contents scattered; trees, chimneys, and much fencing were blown down and carried away. The tornado passed through corn and cotton-fields, which it beat down and ruined; its path was about three hundred yards wide and two miles long. The tornado was accompanied by a noise resembling distant thunder, and pursued a northeasterly course. During a heavy gale on the 28th, the schooner "Paragon" was blown ashore at Ocracoke; a building was also blown down.

New York: 14th. A heavy wind storm occurred in the Mohawk valley at about 5:00 p. m., causing much damage. At Mindenville, Montgomery county, a barn was blown down and one man was killed. At Mexico, Oswego county, many trees were blown down, several houses were unroofed, and fruit trees were stripped. At the agricultural fair, which was being held near the town, several tents were blown down, and other building were damaged. Many of the exhibitors suffered considerable loss of stock and other property, and several persons were more or less injured. A severe storm occurred in the southwestern part of Albany county on the 14th. Several houses and out-buildings were blown down and others were damaged; trees were uprooted and orchards laid waste. At Albany the storm was less severe, and only slight damage was done in the city. The storm was preceded by the appearance of a dense black cloud, which changed to deep yellow as it approached. During the gale of the 15th, much damage was done to fruit trees in the vicinity of Rochester, and fields of corn were prostrated, and seriously damaged.

North Volney, 19th: A violent storm occurred at 3:20 p. m., many trees were uprooted. The storm lasted about fifteen minutes.

Ohio: Sandusky, 19th. During the gale which occurred on the afternoon of the 19th, the s.s. "Alaska" was driven ashore and sustained slight damage.

Virginia: Lynchburg, 3d. During a storm several trees were blown down in the suburbs.

Vermont: Strafford, 14th. At 7.45 p. m. a tornado of considerable force passed in a northeasterly direction from Tunbridge to Strafford; several building were unroofed and trees uprooted. Its track was about one-quarter of a mile wide and four miles long.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for September, 1882, with the telegraphic reports for the succeeding twenty-four hours, shows the general average percentage of verifications to be 90.08 per cent. The percentages for the four elements are: Weather, 91.98; direction of the wind, 88.06; temperature, 90.99; barometer, 89.14 per cent. By geographical districts, they are: For New England, 88.9; middle Atlantic states, 90.4; south Atlantic states, 93.3; east Gulf states, 92.8; west Gulf states, 93.1; lower lake region, 88.6; upper lake region, 87.1; Tennessee and the Ohio valley, 91.7; upper Mississippi valley, 88.7; lower Missouri valley, 85.7; north Pacific coast region, 94.7; middle Pacific coast region, 98.8; south Pacific coast region, 98.8.

There were forty-four omissions to predict (twenty-nine being due to the absence of reports from the Pacific coast), out of 3,690, or 1.19 per cent. Of the 3,646 predictions that have been made, forty, or 1.10 per cent., are considered to have entirely failed; sixty, or 1.64 per cent., were one-fourth verified; three hundred and twenty-two, or 8.83 per cent., were one-half ver-

ified; four hundred and sixty-three, or 12.70 per cent., were three-fourths verified; 2,761, or 75.73 per cent., were fully verified, so far as can be ascertained from the tri daily reports. The percentages for August will be published hereafter.

CAUTIONARY SIGNALS.

One hundred and forty-six cautionary signals were displayed during the month of September, 1882, of which one hundred and fifteen, or 78.77 per cent., were justified by winds of twenty-five miles per hour, at or within one hundred miles of the station. Fifty signals were changed from cautionary to off-shore; of these, thirty-seven, or 74 per cent., were fully justified; forty-five, or 90 per cent., were justified as to direction only, and thirty-nine, or 78 per cent., were justified as to velocity.

Seventy-nine winds of twenty-five miles or more per hour were reported, for which no signals were ordered; many of these were high local winds or strong sea-breezes.

NAVIGATION.

STAGE OF WATER IN RIVERS.

In the table on the right-hand of chart number iii. are given the highest and lowest stages of water observed at the Signal Service stations during the month of September, 1882. In the first column of this table are given the heights of water on the gauge which have been found dangerous to property at the stations.

The rivers have remained low during the month. In the Mississippi the highest water at the various stations from Saint Paul to New Orleans occurred between the 1st and 9th, except at Cairo and Memphis, where the highest stages were recorded on the 21st and 23d respectively.

In the Missouri the highest stages occurred on the 1st and 2d, and the lowest from the 24th to the close of the month.

The Tennessee river at Chattanooga was five feet and nine inches above low-water mark on the 1st, which is an unusually good boating stage for the season. During the twenty-four hours ending at 1:27 p. m., of the 13th, the river rose nine feet and nine inches; it remained stationary during the 14th, and fell rapidly on the 15th.

HIGH TIDES.

New Haven, Connecticut, 28th. Hightest tide for many years; lumber yards flooded.

New York City, 26th. Very heavy sea; everything within its reach at Brighton Beach destroyed. The marine railroad between Brighton and Manhattan beaches was completely wrecked. The outer platform of the Brighton bathing pavilion was carried away, and other damage done. The high water continued on the 27th and 28th; many of the piers were covered, and at the ferry landings, the bridges were floated so high as to interfere with travel.

Ocean City, Maryland. Very high tides from 25th to 28th.

Cape Lookout, North Carolina, 10th. Very high tide, with tremendous sea-swell. 22d, highest sea-swell observed since August, 1879. High tides also occurred on the 24th and 26th.

Hatteras, North Carolina, 25th. Heavy sea running over the beach. 28th, the southern part of the island submerged.

Portsmouth, North Carolina. Very high tides from the 25th to 30th. On the 25th, the beach and island were submerged; on the 28th, the tide was the highest ever known.

Cedar Keys, Florida, 9th. A part of the town was inundated during the evening; lumber, etc., were floated into the streets. The water stood in the streets to a depth of four feet. The tide rose two feet higher than the high tide of 1873. The loss to property is estimated at $100,000. The railroad will have to be rebuilt for a distance of four miles, a part of which (three-fourths of a mile) has entirely disappeared.

Port Eads, Louisiana, 9th: During the cyclone, the east side of the town was flooded by the rising of the water in bay, people were compelled to vacate their dwellings.

Punta Rassa, Florida, 9th.

Northport, Michigan, 14th: During the day, a sudden rise was observed in Traverse bay, about three miles south of station. The water rose from ten to fifteen feet above the ordinary level.

27th. Along the New Jersey coast, from Seabright to Monmouth Beach, the tide is reported to have been the highest known for the past forty years. At Bay View and Seaside, thousands of dollars worth of property was destroyed.

At Herbertstown and Summit, the bridges were lifted from their supports. At Swan creek, the docks and embankments were washed away. At Highland station the beach was cut out and the tracks of the New Jersey Southern railroad were covered with sand hills and all traffic was stopped.

High tides also occurred at Eastport, Maine, 29th, 30th; Smithville, North Carolina, 29th; Norfolk, Virginia, 26th; Little Egg Harbor, New Jersey, 26th; Charlestown, Massachusetts, 27th to 30th.

FLOODS.

The most destructive floods which have occurred during the month, were caused by the very heavy rains which fell along the Atlantic coast during the passage of low area iv.

Reports of the damage caused by these floods are given below:

Massachusetts: Springfield, 23d, a washout occurred on the Boston and Albany railroad, causing delay of trains. Many cellars were flooded. Greenfield, 23d, many culverts were washed away. The damage done in Franklin county is estimated at $6,000. At North Adams, a bridge was carried away, and several mills were damaged. At Orange, the Miller river overflowed its banks, submerging considerable pasture lands. Trains were delayed owing to land-slides on railroads.

Rhode Island: Newport, 24th, on the Shore Line railroad, the heavy rains have caused washouts, delaying trains.

Connecticut: Hartford, 23d, the river rose at the rate of one foot per hour, from 7:00 to 11:00 a. m., being the most rapid rise since the great flood of 1854. A large area of meadow land north of the city is inundated; and a large quantity of logs were carried down the stream. New Haven, 23d, the streets were badly washed, and cellars flooded. The Naugatuck river overflowed its banks, carrying away some costly bridges that were being constructed near Waterbury.

New Jersey: Paterson, 24th, the streets along river were flooded, and many families forced to take refuge in the upper portions of their dwellings. The river rose twelve feet. Many bridges were washed away and others seriously undermined. At the mills on the Passaic river, operations have been suspended owing to damage caused by high water. At Rahway, the damage is estimated at $500,000. The streets were flooded with water; eight bridges were washed away, and two others were undermined. Trains were stopped and all communication was cut off for many hours. One person was drowned, and several were injured.

In Bound Brook, on the 24th, the water flowed through the streets of the town, and covered the counters of the stores on Main street. Large quantities of valuable goods were ruined. At the woolen mills the water rose over the looms, causing a loss of about $10,000. A bridge and a long stretch of the Lehigh valley railroad were washed away. The track of the New Jersey Central railroad was three feet under water, and at the station the water was two feet deep. The canal banks gave way in several places, and the canal lock, five miles below here, was destroyed. The water was two feet and eight inches higher than the flood of 1865.

At Newark the sewers were damaged, and fifteen feet of the Chatham street reservoir were swept away.

At Jersey City and Hoboken much damage was done. The fields were completely inundated, and in many cases the water covered the floors of the houses, causing people to vacate their homes. The reservoir of the Hackensack water-works was considerably damaged. A washout occurred on the New York and Western railroad. A number of sewers in various parts

of Jersey City were damaged to the extent of $10,000. At Plainfield a substantial stone bridge over Green brook was washed away.

At Elizabeth, on the 23d, the water in the streets was knee-deep, flooding many of the houses. Barns and small buildings in some localities were floated away.

Moorestown: From the 21st to 24th, nearly all of the mill-dams in this vicinity were washed away; numerous and extensive washouts occurred on the railroad.

New York: New York City, 23d, six brick buildings in course of construction were undermined and fell, causing a loss of $10,000. Many basements and cellars were flooded, causing great damage.

Sing Sing, 23d, washouts occurred along the railroad and travel was considerably delayed. The station was surrounded by water and many cellars were flooded.

Poughkeepsie, 23d, reports from the interior of the counties along the Hudson river state that roads were badly washed; the lowlands flooded and bridges were swept away.

Newburgh, 27th, many bridges have been swept away or damaged in this vicinity, and the new railroad station at this place was considerably damaged. Many cellars were flooded, causing much damage to merchandise.

At Cornwall, eight bridges were washed away, entailing a loss of $12,000.

At Mountainville, a barn and dam were carried away, and a flour mill was damaged.

Port Jervis, 23d, trains have been delayed by washouts in the Ramapo valley; the tracks are submerged in places.

Pennsylvania: Philadelphia, 22d, damage to the extent of several thousand dollars has been done in and about the city; bridges, drains, and culverts were badly damaged. On the 23d, the Schuylkill river rose six feet. Much damage is reported to have been done at various points along the railroads. Reading, 23d, many cellars were flooded and the country roads are rendered impassable. Many hay-stacks have been swept away and some stock has been drowned. Newtown, 23d, several buildings were washed away and others were injured. Washouts occurred on the railroads in this vicinity.

Virginia: Fredericksburg, 23d, in Essex county four mills were washed away and great damage was done to crops and other property.

North Carolina: Tarboro', 22d, the heaviest rainstorm since 1842 occurred last night, sweeping away many bridges. The track of the Tarboro branch of the Wilmington and Weldon railroad was much damaged. Charlotte, 14th, serious washouts have occurred on the various railroads in this vicinity.

Texas: San Antonio, 6th, during a heavy rainstorm the streets were flooded. The San Antonio river rose eight feet, causing much damage to houses in the lower part of the city. The San Pedro creek, passing through the western part of the city, rose rapidly washing away all the bridges and houses on its banks. Several bridges were washed away on the International railroad and the track was much damaged.

Austin, 6th, Barons creek, south of this city has overflowed the farms on its its banks, and fences and crops have been washed away. A flouring mill on the creek was destroyed, and another was badly damaged. The damage caused will amount to several thousand dollars.

TEMPERATURE OF WATER.

The temperature of water, as observed in rivers and harbors at the Signal Service stations, with the average depth at which observations were taken, is given in the table on the right-hand of chart number ii. In the first column of the table is given the maximum temperature observed during the month; and in the second column the minimum temperature observed during the same period.

The following table gives the highest and lowest temperatures of water at the several stations, with the range of water temperature, and the mean temperature of the air at the station, and the depth of water at which the observations were taken.

The greatest ranges occurred as follows: 22° at Provincetown; 18° at Chincoteague and Galveston; and17.°6 at Alpena. The smallest are: 2.°7 at Eastport; 3° at San Francisco; 3.°2 at Key West; and 5° at Marquette and Punta Rassa.

Temperature of Water for September, 1882.

STATION.	Temperature at bottom.		Range.	Average depth, feet and inches.		Mean temperature of the air at station.
	Max.	Min.		ft.	in.	
	°	°	°			°
Atlantic City	73.9	68.0	5.9	6	10	69.1
Alpena	69.8	52.2	17.6	11	8	58.1
Augusta	83.5	68.5	15.0	9	10	74.6
Baltimore	78.0	68.0	10.0	10	1	69.0
Block Island	67.4	59.4	8.0	8	2	64.8
Boston	64.5	56.0	8.5	25	0	62.7
Buffalo	73.8	63.5	10.3	9	11	62.2
Burlington	73.3	60.0	13.3	17	0	60.1
Cedar Keys	87.0	80.0	7.0	10	6	79.2
Charleston	84.1	73.9	10.2	41	10	76.5
Chicago	72.8	62.8	10.0	8	2	65.0
Chincoteague	80.0	62.0	18.0	5	6	70.5
Cleveland	75.7	59.7	16.0	14	0	64.0
Detroit	74.0	62.0	12.0	24	3	64.2
Duluth	67.0	58.0	9.0	15	0	58.5
Delaware Breakwater	74.3	64.5	9.8	6	6	69.8
Eastport	50.4	47.7	2.7	16	3	56.0
Escanaba	66.0	51.8	14.2	15	0	58.2
Galveston	86.0	68.0	18.0	14	10	78.3
Grand Haven	71.5	57.0	14.5	19	0	62.2
Indianola	85.4	74.1	11.3	9	9	78.2
Jacksonville	87.0	79.0	8.0	18	0	77.8
Key West	87.0	83.8	3.2	16	3	82.2
Mackinac City	67.0	57.4	6.6	13	0	58.6
Marquette	61.8	56.8	5.0	10	6	56.9
Milwaukee	71.0	62.0	9.0	8	0	62.7
Mobile	81.5	77.0	4.5	15	0	75.7
New Haven	74.2	59.2	15.0	15	3	64.5
New London	69.0	61.0	8.0	12	6	64.8
Newport	68.9	59.7	9.2	10	1	64.6
New York	74.5	63.0	11.5	22	6	66.9
Norfolk	81.0	67.0	14.0	17	6	72.1
Pensacola	84.6	76.3	8.3	18	4	75.3
Portland, Me	60.0	53.5	6.5	20	1	61.7
Portland, Oreg	66.2	60.3	5.9	65	10	59.4
Port Eads	82.8	78.3	4.5	9	5	78.6
Provincetown	70.0	48.0	22.0	14	0	62.4
Punta Rassa	88.0	83.0	5.0	11	11	79.6
Sandusky	74.9	60.1	14.8	10	0	65.6
Sandy Hook	72.5	66.0	6.5	1	10	68.6
San Francisco	60.5	57.5	3.0	32	1	58.6
*Savannah	82.8	73.4	9.4	13	5	77.1
Smithville	82.0	70.0	12.0	10	0	73.5
Toledo	73.5	63.5	10.0	11	8	64.2
Wilmington	81.5	71.5	10.0	13	0	74.0

*Observation not taken on 14th.

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroral displays were of frequent occurrence during September. The display on the evening of the 11th was the most important of the month, and was observed from the lower lake region westward to Dakota and southward to Virginia and southern Illinois. None of the displays noted were remarkable for their brilliancy or extent of observation. On the various dates they were reported as follows:

2d: Halifax, Nova Scotia.

3d: Duluth, Minnesota, faint auroral light from 9:15 to 9:25 p. m. Mackinac City, Michigan, pale auroral light at 9:00 p. m., lasting forty-five minutes.

4th: Deadwood, Dakota, faint auroral light, with occasional beams extending upward to an altitude of from 40° to 60°. It was first observed at 8:00 p. m., and disappeared at 11:00 p. m. Saint Vincent, Minnesota, faint auroral display from 10:00 p. m. to midnight. Marquette, Michigan, faint aurora from 9:10 to 9:40 p. m. Franklin, Wisconsin, faint auroral display from 9:00 to 10:00 p. m. Alpena, Michigan, aurora visible at 9:30 p. m., consisting of a diffuse light in the northern sky, with a few small streamers reaching an altitude of 60°. Cambridge, Massachusetts, distinct aurora observed at 10.15 p. m. Monticello, Iowa, aurora observed at 10:00 p. m. This display was also observed at the following Canadian stations: Toronto, Fredericton, and Halifax.

5th: Moorhead, Minnesota, faint aurora from 9:00 to 10:00 p. m. Franklin, Wisconsin, faint display from 9:00 to 10:00 p. m. Alpena, Michigan, diffuse auroral light with no streamers at 9:50 p. m. Rochester, aurora from 9:45 to 11:45 p. m., consisting of a few short faint beams shooting upward from a

dark and well defined segment. North Volney, New York, auroral streamers reaching an altitude of from 25° to 45° observed at 11:00 p. m. Mount Washington, an auroral display began at 10:40 p m. and continued until early morning of the 6th. New Haven, auroral light visible in the northern sky from 11:00 p. m. until midnight. Thatcher's Island, Massachusetts, auroral arch of yellowish light with waving beams observed from 9:00 p. m., until 12:30 a. m. of the 6th; altitude from 20° to 50°; azimuth, 170° to 210°. Gardiner, Maine, bright auroral beams observed from midnight until after 1:00 a. m. of the 6th. Eastport, Maine, faint auroral light of pale yellow color, observed from 8:45 p. m., until morning of the 6th. Dyberry, Pennsylvania, a few auroral beams were observed near midnight. This display was also observed at the following Canadian stations: Toronto and Charlottetown.

6th: Burlington, Vermont, from 10:00 to 11:40 p. m., pale saffron colored auroral light, with streamers in the north and northeast; no arch or segment visible. Hatteras, North Carolina, faint aurora of straw color observed at 12:55 a. m., which was soon after dissipated by the light of the moon.

7th: Mackinac city, Michigan, pale auroral display from 10:00 p. m. to 1:00 a. m. of the 8th.

8th: Burlington, Vermont, from 11:00 p. m. to 12:10 a., m. of the 9th, consisting of an indistinct arch, streamers, and a well-defined dark segment. Vevay, Indiana, faint crimson auroral light from 8:00 to 10:00 p. m. Toronto, Ontario, during evening.

9th: Vevay, Indiana, faint auroral light at 9:00 p. m.

11th: Fort Meade, Dakota, auroral display during the evening. De Soto, Nebraska, aurora during the evening. Beloit and Manitowoc, Wisconsin, observed during the evening. Swanwick, Illinois, auroral streamers at 9.00 p. m.; first visible from north to northeast, but later it extended westward and became a diffuse light over a dark cloud. The display ended at 10.00 p. m. Riley, Illinois, bright auroral arch of 12° altitude with a few rapidly moving streamers reaching upward 30°. The display ended at 10.00 p. m. Fort Brady, Michigan, aurora observed from 8.00 to 9.00 p. m. Northport, Michigan, aurora beams reaching an altitude of 50°, with dark clouds beneath, observed from 9.30 to midnight. Mackinac City, Michigan, auroral display consisting of two arches, the upper one extending across the sky from east to west through the zenith. At times the whole northern sky was illuminated by the aurora. Alpena, Michigan, brilliant auroral arch at 9.00 p. m., extending from northwest to northeast with streamers reaching an altitude of 70°. The streamers disappeared at 10.30 p. m., leaving a diffuse light resting on a dark segment. Thornville, Michigan, aurora first observed at 9.00 p. m., and soon after two arches were formed, the upper one being faint, after 9.30 p. m. the clouds broke up into luminous clouds and disappeared at 10 30 p. m. Lansing, Michigan, observed during the evening. Lafayette, Indiana, observed during the evening. Wabash, Indiana, faint aurora at 9.30 p. m. Westerville, Ohio, aurora from 9.00 to 10.30 p. m., consisting of a bright arch and streamers. Cleveland, Ohio, aurora visible from 9.00 to 10.00 p. m., consisting of bright stationary light of pinkish color in the northern sky. Erie, Pennsylvania, auroral beams reaching an altitude of 90°, visible from 8.35 to 10.20 p. m. Variety Mills, Virginia, strong auroral light observed between the clouds in the northern sky at 10.00 p. m. Toronto, Ontario, during evening.

12th: Tobacco Garden, Dakota, aurora observed through broken clouds at 8.20 p. m. De Soto, Nebraska, observed during the evening. Cambridge, Massachusetts, auroral streamers observed at 10.30 p. m.; at 11 p. m. the aurora was somewhat visible, but very faint. Woodstock, Vermont, faint auroral light at 10 p. m.

17th: Wicklow, Dakota, aurora observed during the evening.

18th: Sydney, Nova Scotia.

19th: Portland, Maine, faint auroral light from 2:00 to 3:00 a. m.

20th: Tobacco Garden, Dakota, faint aurora at 9:00 p. m., extending to an altitude of 20°, and covering about 55° of the horizon. De Soto, Nebraska, observed during the evening. Logansport, Indiana, auroral streamers above a dark cloud were observed during the evening. Spokane Falls, Washington territory, aurora observed at 4.19 a. m., and continued until the approach of day. It consisted of a small faint arch about 15° altitude, and covered about 30° of the northern horizon.

24th: Fort Madison, Iowa, during the evening.

26th: Saint Vincent, Minnesota, faint aurora from 10:25 to 11:00 p. m. Newport, Vermont, and Fort Madison, Iowa, during the evening.

30th: Charlottetown, Prince Edward Island.

THUNDER-STORMS.

Thunder-storms were reported in the various districts on the following dates:

New England: 3d, 4th, 5th, 7th, 8th, 9th, 11th, 14th, 18th to 23d.

Middle Atlantic states: 2d, 3d, 5th, 8th, 9th, 11th, 14th, 18th to 23d.

South Atlantic states: 1st to 11th, 18th, 19th, 21st, 22d, 23d, 25th, 27th.

Florida peninsula: 2d, 8d, 9th, 20th, 22d, 26th, 28th, 29th.

East Gulf states: 1st to 8th, 15th, 17th, 21st, 24th, 25th, 28th, 29th, 30th.

West Gulf states: 1st, 2d, 4th to 9th, 15th, 18th to 21st, 25th to 30th.

Rio Grande valley: 4th, 21st, 27th, 29th, 30th.

Ohio valley and Tennessee: 1st to 5th, 7th, 8th, 9th, 12th, 14th, 16th to 21st, 24th, 25th, 28th, 29th, 30th.

Lower lake region: 2d, 3d, 8th, 13th, 14th 17th to 21st, 29th, 30th.

Upper lake region: 2d, 3d, 9th, 12th, 13th, 14th, 17th, 18th, 19th, 22d.

Extreme northwest: 4th, 7th, 8th, 11th, 18th, 19th, 25th, 26th.

Upper Mississippi valley: 1st, 2d, 3d, 8th, 9th, 10th, 13th, 16th to 20th, 24th, 25th, 26th, 28th, 29th.

Missouri valley: 1st, 2d, 5th, 9th, 16th to 20th, 23d, 24th, 25th, 27th to 30th.

Northern slope: 3d, 9th, 15th, 16th, 26th, 27th, 28th.

Middle slope: 1st, 3d, 7th, 14th, 18th, 19th, 16th, 27th, 36th.

Southern slope: 18th, 19th, 20th, 27th, 29th, 30th.

Southern plateau: 3d, 4th, 13th to 17th, 20th, 26th, 28th, 29th.

Northern plateau: 11th, 24th.

Middle Pacific coast region: 14th, 15th, 16th.

Thunder-storms also occurred at Campo, California, on the 14th, and at Havana, Cuba, on the 4th, and 11th.

During thunder-storms the following instances of damage by lightning have been reported:

Wakefield, Rhode Island, 9th: A building was struck and damaged by lightning, and three men were stunned.

New Haven, Connecticut, 8th: Several buildings were struck by lightning during thunder-storm. Reports from various points state that considerable damage was done by lightning during this storm.

On the summit of Mount Washington, on the 14th, a telephone and transmitter were badly damaged by lightning.

Yates Centre, Kansas, 27th: The post office building was struck by lightning.

Humboldt, Iowa, 4th: A stack of grain was struck and burned by lightning.

Dover, New Hampshire, 15th: A barn was struck by lightning and damaged to the extent of $1,500.

New Market, New Hampshire, 22d: House struck and damaged by lightning.

New York, 15th: During the thunder-storm of last evening the lightning struck the Greenpoint oil works, at Kingsland and Meserole avenues, in Brooklyn, and Donnell's oil works, also, on Kingsland avenue, setting them both on fire. The Greenpoint works were totally destroyed by fire. The machin-

ery, with 60,000 barrels of oil in the works, were valued at $80,000; and the damage to the Donnells' works is estimated at $50,000.

Russell, Kansas, 27th: During thunder-storm a mule and rider were killed about nine miles south of station.

Bryant, Indiana, 18th: Two persons were killed by lightning, and another was seriously injured.

Pottsville, Pennsylvania, 8th: The principal of the high school, at this place, and three boys were severely stunned by lightning while crossing Lawson's Hill.

ELECTRICAL PHENOMENA.

On the summit of Mount Washington, on the 14th, at 8:45 p. m., the anemometer cups were illuminated with electric light. On the 19th, at 10:30 p. m., pointed objects were tipped with electric light.

Pike's Peak, 7th, during a heavy snow storm at 8:30 p. m., the anemometer cups revolved in a circle of light, and other objects were illuminated. The hair and clothing emitted sparks, and a peculiar aching sensation was felt in the fingers.

San Francisco, 15th, telegraph wires charged with atmospheric electricity.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos have been observed in the various districts on the following dates:

New England: 2d, 10th, 23d, 25th, 27th, 28th.
Middle Atlantic states: 1st, 9th, 10th, 17th, 19th, 24th, 27th.
South Atlantic states: 6th, 9th, 17th, 18th, 28th, 29th, 30th.
East Gulf states: 3d, 5th, 6th, 14th, 15th, 16th.
Ohio valley and Tennessee: 5th, 6th, 7th, 10th, 13th, 15th, 16th, 17th, 25th, 26th.
Lower lake region: 2d, 7th, 10th, 11th, 16th to 19th, 23d, 26th, 28th.
Upper lake region: 6th, 7th, 10th, 15th, 16th, 17th.
Upper Mississippi valley: 4th to 7th, 15th, 16th, 30th.
Missouri valley: 1st, 4th, 5th, 17th, 26th, 27th, 28th, 30th.

Solar halos were also reported from the following stations not included in the districts named above:

Punta Rassa, Florida, 6th, 18th.
Moorhead, Minnesota, 27th.
Tobacco Garden, Dakota, 24th.
Yates Centre, Kansas, 4th, 5th, 15th.
Clay Centre, Kansas, 26th.
Creswell, Kansas, 18th.
Salt Lake City, Utah, 4th.
Santa Fé, New Mexico, 2d, 11th, 24th, 29th.
Colfax, Washington territory, 29th.
Sacremento, California, 11th.
San Francisco, California, 1st, 2d.

LUNAR HALOS.

Lunar halos have been observed in the various districts on the following dates:

New England: 2d, 4th, 19th, 22d to 26th, 28th.
Middle Atlantic states: 2d, 4th, 22d, 23d, 26th, 27th.
South Atlantic states: 21st, 24th, 29th, 30th.
East Gulf states: 26th, 27th, 28th, 29th.
West Gulf states: 19th, 24th, 26th to 29th.
Ohio valley and Tennessee: 6th, 7th, 24th, 25th, 26th.
Lower lake region: 2d, 19th, 22d, 25th to 29th.
Upper lake region: 26th, 27th.
Extreme northwest: 24th to 27th, 29th.
Upper Mississippi valley: 21st, 22d, 24th to 27th, 29th, 30th.
Missouri valley: 24th, 25th, 26th, 28th, 30th.
Northern slope: 14th, 19th, 22d, 25th, 26th, 29th.
Northern plateau: 23d to 27th.

Lunar halos were also reported from the following stations not included in the districts named above:

Punta Rassa, Florida, 30th.
Havana, Cuba, 26th, 30th.
Uvalde, Texas, 28th.
Santa Fé, New Mexico, 24th 28th.
West Las Animas, Colorado, 29th.
Salt Lake City, Utah, 24th.
Los Angeles, California 27th.

MIRAGE.

Northport, Michigan, 20th: From 11:00 a. m. to 3:00 p. m., the opposite shore (twelve miles distant) appeared distinctly visible. Objects and localities were discernable and recognized, which could not otherwise have been seen.

Indianola, Texas, 1st to 4th, 23d, 25th, 26th.
Alexandria, Dakota, 21st, 23d.
Genoa, Nebraska, 1st.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and eighty-five stations show 5,459 observations to have been made, of which fifteen were reported doubtful; of the remainder, 5,444, there were 4,800, or 88.2 per cent., followed by the expected weather.

SUN SPOTS.

The following record of observations has been forwarded by Mr. D. P. Todd, Director of the Lawrence Observatory, Amherst, Massachusetts:

DATE—Sept., 1882.	No. of new		Disappear'd by solar rotation.		Reappear'd by solar rotation.		Total No. visible.		REMARKS.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
2, 2 p. m.	1	15‡	0	0	0	0	5	25‡	
3, 3 p. m.	0	10‡	0	0	0	0	5	35‡	
4, 1 p. m.	0	10‡	1	5	0	0	4	45‡	
5, 11 a. m.	0	0	0	0	0	0	4	45‡	
7, 10 a. m.	0	0	1	10‡	0	0	3	35‡	
8, 10 a. m.	0	0	1	15‡	0	0	2	20‡	
9, 9 a. m.	1	2	0	0	1	2	3	20‡	
10, 3 p. m.	0	0	0	0	0	0	3	20‡	
12, 3 p. m.	1	1	0	10‡	1	1	4	12‡	
14, 8 a. m.	0	13‡	0	5	1	13‡	4	20‡	Two spots quite large.
18, 2 p. m.	1	20‡	.....	.....	.....	.....	3	35‡	Two spots quite large.
19, 9 a. m.	0	0	0	0	0	0	3	35‡	Two spots quite large.
20, 3 p. m.	0	0	0	0	0	0	3	35‡	Two spots quite large.
23, 5 p. m.	1	2	.....	.....	1	2	4	25‡	
24, 9 a. m.	1	1	1	2	1	1	4	25‡	Two spots very large.
28, 5 p. m.	1	15‡	.....	.....	.....	.....	5	25‡	One spot very large.
29, 8 a. m.	0	5	0	0	0	0	5	30‡	One spot very large.
30, 8 a. m.	0	0	0	0	0	0	5	30‡	One spot very large.

‡Approximated. Faculæ were seen at the time of every observation.

Mr. H. D. Gowey, at North Lewisburg, Ohio, reports: Sun-spots were observed on all clear days during the month. They were most numerous at the beginning and close of the month; largest and most active on the 28th; and smallest on the 12th.

Mr. David Trowbridge, at Waterburg, New York, reports: 2d, three groups, six spots; one group has appeared by rotation. 4th, four groups, thirteen spots. 6th, three groups, fifteen spots; one group has gone out since the 4th. 7th, three groups (same as 6th), twelve spots. 8th, two groups, six spots; one group has disappeared by rotation. 9th, three groups, eight spots; one faint spot surrounded with faculæ has just appeared by rotation. 12th, two groups, six spots; all faint. 14th, three groups, five spots; one group has disappeared by rotation. 15th, one group, three spots; one group has disappeared by rotation, and one near the centre has gone out. 16th, one group, three spots; atmosphere hazy. 17th, two groups, nine spots. 19th, two groups, five spots; somewhat cloudy. 24th, three groups, four spots; one group has just appeared by rotation. 25th, four groups, eleven spots; one group has disappeared by rotation, and one has appeared by rotation; faculæ in the west. 26th, four groups, seven spots; somewhat cloudy. 27th, three groups, six spots; faculæ in the west. 30th, four groups, ten spots; one large group; faculæ in the east.

Captain John Carroll, of the s. s. "Hevelius," reports: 5th, in N. 28°, W. 19°, observed a large spot on sun's disk, and 6th, in N. 31°, W. 17°, the same spot was observed.

The following record of observations has been forwarded by Mr. A. S. Bender, of Sacramento, California:

DATE—Sept., 1882.	No. of new		Disappeared by rotation		Reappeared by rotation.		Total No. of		Remarks.
	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	Gr'ps	Spots	
1, 4 p. m.	1	5	.....	.....	1	5	4	15†	
2, 4 p. m.	1*	15†	1	5	.....	.....	4	25†	New spots in group noted yesterday.
3, 4 p. m.	.....	.....	1	5	.....	.....	3	30†	New spots in group noted yesterday.
4, 4 p. m.	1	25†	.....	.....	.....	.....	4	60†	
5, 4 p. m.	.....	.....	.....	.....	.....	.....	4	45†	Spots increased in size diminished in number.
9, 4 p. m.	.....	.....	1	15	.....	.....	3	35†	Many spots becoming dim.
12, 4 p. m.	1	20†	1	10	1	1	3	45†	Spots becoming dim and some disappeared.
13, 4 p. m.	.....	.....	1	10	0	20	3	35†	
14, 4 p. m.	1	1	.....	.....	.....	.....	4	30†	Some spots very dim, some disappeared.
15, 4 p. m.	.....	.....	.....	.....	.....	.....	.....	.....	Cloudy, raining 1 day.
16, 4 p. m.	.....	.....	.....	.....	.....	.....	.....	.....	
17, 4 p. m.	.....	.....	.....	.....	.....	.....	.....	.....	
18, 4 p. m.	.....	.....	2	10	.....	.....	3	30†	Two groups suddenly appear.
19, 4 p. m.	.....	.....	.....	.....	.....	.....	2	15†	One group disappeared by rotation.
20, 4 p. m.	.....	.....	.....	.....	.....	.....	2	10†	Spots changed; larger and ewer.
21, 4 p. m	1	1	.....	.....	.....	.....	3	10†	One group disappeared not by rotation.
22, 4 p. m.	1	1	.....	.....	.....	.....	4	20†	Some spots quite dim.
23, 4 p. m.	.....	.....	.....	.....	1	1	5	25†	Some spots quite dim.
25, 4 p. m.	.....	.....	1	10	.....	.....	6	25†	Two groups disappeared not by rotation. Three come in by rotation, but not reappeared.
26, 4 p. m.	.....	.....	.....	.....	0	5	6	40†	One group growing dim.
27, 4 p. m.	.....	.....	.....	.....	.....	.....	6	40†	Spots increased in number in one group, diminished in another.
28, 4 p. m.	.....	.....	1	6	.....	.....	5	35†	Some spots very dim.
29, 4 p. m.	.....	.....	.....	.....	.....	.....	5	30†	Do.
30, 4 p. m.	.....	.....	.....	.....	.....	.....	5	25†	Some spots very dim; much change in form of spots.

† Estimated. *Perhaps reappeared.

METEORS.

Springfield, Massachusetts, 30th: A very brilliant meteor was observed at 7:00 p. m., in the west-southwestern sky at an altitude of 50°. Its course was downward and inclined slightly toward the south, and about 10° in length. It was apparently about three-fourths the size of the moon and of a bright whitish color. During its flight (of five seconds duration), the color changed and size diminished until it disappeared, when it resembled a small star of dull red color. This meteor was probably the same which was observed at Poughkeepsie, at about 7:00 p. m., where it is reported to have been brilliant, and about the size of a six-pound cannon ball.

Montgomery, Alabama, 6th: A meteor of considerable brilliancy was observed at 8:10 p. m., at an altitude of 30°. It had the appearance of an ordinary rocket, leaving a trail and bursting into fragments of purple and red colors. Its course was westerly and downward for about 15°. From the following reports it would seem that this meteor was observed at Mobile and Fort Barrancas on this date:

Mobile, 6th: A very large meteor, of cylindrical shape, was observed at 8:00 p. m. It produced a bright light of bluish tint; and pursued a downward course from a point in the northeastern sky.

Fort Barrancas, Florida, 6th: At 7:45 p. m., a brilliant meteor, of light blue color was observed, passing from west to east.

Fort Sisseton, Dakota, 10th: At 7:15 p. m., a meteor of great brilliancy and of an elongated spiral form, made its appearance in the southeastern sky, moving with great velocity and burst almost directly over this post. It left a tail which was visible and apparently stationary for fully fifteen minutes; finally disappearing in the northwest. Its color was of an intense golden hue.

Swanwick, Illinois, 24th: A brilliant meteor was observed in the northwestern sky. It moved southwestward and burst into two pieces at an altitude of 12° or 15°.

Lebanon, Pennsylvania, 8th: During a heavy thunderstorm this evening, a meteor weighing one pound and eleven ounces, fell in the centre of the principal street, appearing like a ball of fire.

Meteors were also reported to have been observed at the following stations:

Kittyhawk, North Carolina, 13th.
Tobacco Garden, Dakota, 1st.
Campo, California, 2d, 3d, 6th, 9th, 15th.
Fort Meade, Dakota, 10th.
Wicklow, Dakota, 1st.
Charleston, Illinois, 4th, 5th, 18th.
Vevay, Indiana, 18th, 25th.
Indianola, Iowa, 14th.
Humboldt, Iowa, 14th, 18th.
Monticello, Iowa, 16th, 30th.
Russell, Kansas, 2d, 13th.
Fort Scott, Kansas, 13th.
Somerset, Massachusetts, 8th.
Rowe, Massachusetts, 5th.
Fayette, Mississippi, 4th, 20th, 23d to 25th.
Corning, Missouri, 13th.
Clinton, Missouri, 24th, 25th, 26th.
Clear Creek, Nebraska, 1st, 13th, 17th.
Readington, New Jersey, 29th.
Waterburgh, New York, 1st.
Weldon, North Carolina, 21st.
Murfreesborough, Tennessee, 3d, 19th.
Wytheville, Virginia, 17th.

EARTHQUAKES.

Panama, 13th: The state of Panama principally, and the adjoining states in Columbia, and in Costa Rica and Nicaragua, have been subjected since the 7th to a series of earthquakes. In Panama the first was felt at 3:20 a. m. of the 7th, which was followed, about half an hour later, by a second one. Both of these shocks were felt at Colon, and generally throughout the state; also Carthagena, in the state of Bolivar; Rivas, Nicaragua, (about eighteen miles from the Pacific,) and at Greytown, the Atlantic port of the San Juan river, which is about one hundred and fifty miles from the before-mentioned town. The shocks caused great alarm in Panama. The walls of more than sixty houses were more or less damaged. The high crown of the pediment of the cathedral fell and hurled about two hundred tons of masonry work, decorative architecture, and a few statues down through the roof into the cathedral square. The offices of the Inter-Oceanic Canal Company were damaged to the extent of $50,000. The city of Aspinwall suffered in a similar manner, but the damage was not so great. It will will probable cost $250,000 to repair the damage done in Panama. No buildings fell in the city but the inhabitants fearing to expose themselves to the risk of being crushed by falling masonry, moved outside of the city and resided in the cane and palm leaf houses. In a few places the soil show the effects of the shock, and cracks from one to six inches are visible. The cable from Aspinwall to Jamaica was broken by the first shock about fifty miles from the isthmus. Mr. R. K. Gray, F. R. G. S. and chief of the cable expedition now here, is of the opinion that the center of the earthquake was near Aspinwall, and that the wave travelled from north to south.

The earthquake shock of the morning of the 27th, was felt at various points in Missouri, Illinois and Indiana. At Saint Louis, the shock was felt at 4:05 a. m. The vibratory motion was from west to east and lasted about five seconds. It was attended by a rumbling noise, resembling that heard when standing over a tunnel during the passage of a train. In the southern part of the city the shock was sufficiently severe to frighten persons from their houses.

At Springfield, Illinois, the shock was felt at 4:45 a. m. and sufficient to awaken persons. It was followed by five distinct tremors. The motion was from west-southwest to east-northeast.

Centralia, Illinois: At 4:30 a. m., a well-defined shock of earthquake was felt lasting several seconds. It seemed to come from the west and was accompanied by rumbling sounds. It shook houses very perceptibly, and awakened many persons.

Vincennes, Indiana: A shock of earthquake was felt here at 3:00 a. m. and lasted three minutes.

Swanwick, Illinois: Earthquake shock about 4:00 a. m. Persons were awakened by its vibrations and the rattling of windows, etc. It was observed that the windows in the west ends of houses ceased rattling before those in the east ends, indicating that the vibration was from west to east. The shock was also felt at Cutler, Coulterville, Marissa, Sparta, Pinkneyville and Bunker Hill, Illinois, and Mount Vernon, Indiana.

Greenfield, Illinois: A shock of earthquake was felt in this city at 4:30 a. m. It was preceded by a low rumbling sound, apparently approaching from the east, which was followed immediately by the shock. Buildings were shaken and windows, crockery, etc., rattled. In one building a chimney was badly cracked.

Salem, Illinois: A heavy earthquake shock was felt here about 4:00 a. m. Windows were shaken and people aroused from sleep. A crack in the wall of the National Bank building was considerably widened. A report from Washington, Indiana, states that the shock at that place rang the church bells.

Lebanon, Illinois: Earthquake shock felt at 4:30 a. m., which shook the buildings perceptibly. Pictures and other wall ornaments were swung to and fro.

Shelbyville, Illinois: A heavy shock of an earthquake was distincely felt at 4:30 a. m., shaking doors and windows, and frightening inhabitants.

Flora, Illinois: Severe shock of earthquake felt at 4:30 a. m., lasting nearly five seconds; most of the inhabitants were awakened by the shock.

Alton, Illinois: A severe shock of earthquake felt at 4:15 a. m. There were two distinct shocks, causing windows and doors to rattle. The shock caused considerable alarm.

Vandalia, Illinois: A shock, supposed to be that of an earthquake, was felt at 4:30 a. m., lasting about five seconds. The noise preceding the shock resembled that of an approaching storm, and was heard fully three minutes before the shock was felt. Houses were shaken and people awakened.

Collinsville, Illinois: The most severe earthquake shock that has been experienced here for twenty years was felt at 4:20 a. m. There seemed to be a series of undulations, continuing for at least half a minute, waking nearly all of the inhabitants, and of sufficient force to overturn bottles, etc.

Pana, Illinois: At 4:30 a. m., several distinct earthquake shocks were felt in rapid succession, following which was a deep rumbling sound.

Belleville, Illinois: A strong earthquake shock was felt at 4:20 a. m., arousing people from sleep, and displacing light articles upon shelves and tables. The shock was preceded by a peculiar rumbling or grating sound.

Nashville, Illinois: A shock of earthquake was distinctly felt here between 4:00 and 5:00 a. m.

Campo, California, 30th: A sharp shock of earthquake was felt at this place at 10:57 a. m., lasting about two seconds. The direction of motion was from southeast to northwest.

WATERSPOUTS.

Cape May, New Jersey, 6th: A waterspout was observed at 12:00 m., about six miles northwest of this station. It was apparently about one hundred and fifty feet high, and moved in a northwesterly direction with great rapidity. It was observed for about five minutes.

Charleston, South Carolina, 3d: A waterspout was observed at James' Island, about two miles off thebar. It was preceded by a disturbance of the water, which became more and more agitated until a column was formed, which met the cloud. The large column of water whirled rapidly and moved southwestwardfor about a mile, when the cloud and water separated.

SAND STORMS.

Fort Cummings, New Mexico, 15th.
Camp Thomas, Arizona, 3d, 26th.
Los Angles, California, 16th.
Umatilla, Oregon, 14th, 26th, 27th.
Fort Benton, Montana, 9th, 11th.

POLAR BANDS.

Portland, Maine, 17th.
Gardiner, Maine, 2d, 17th, 24th.
Auburn, New Hampshire, 10th, 12th, 20th.
Freehold, New Jersey, 24th.
Vineland, New Jersey, 17th, 19th.
Wytheville, Virginia, 4th, 13th.
Nashville, Tennessee, 4th.
Riley, Illinois, 27th.
Guttenburg, Iowa, 30th.
Yates Centre, Kansas, 5th.
Pretty Prairie, Kansas, 5th.

ZODIACAL LIGHT.

Havana, Cuba, 3d, 4th, 11th, 14th, 15th, 17th to 25th.
Palestine, Texas, 3d, 9th, 11th, 22d, 24th.
Nashville, Tennessee, 30th.
Monticello, Iowa, 2d, 11th, 12th.
Cambridge, Massachusetts, 19th.
Clear Creek, Nebraska, 3d, faint.

PRAIRIE AND FOREST FIRES.

Tobacco Garden, Dakota: Prairie fires raged in this vicinity from the 4th to 9th and from the 12th to 15th. On the 8th, three hundred and fifty tons of hay were destroyed and on the 13th the fires threatened the safety of this place, causing the observer to take steps to save the instruments and office records.

Fort Yates, Dakota, 6th, 7th and 8th: On the latter date, crops and dwellings were greatly endangered. On the 15th, the fires were very destructive about twenty-five miles west of station. The high wind which prevailed at the time caused the fire to jump all of the ordinary fire "guards" and "breaks." Houses, crops, stock, etc., were destroyed, and the lives of the inhabitants were endangered. On the 16th, the fires were very destructive south of station. Large quantities of stacked hay and grain were burned and many persons narrowly escaped with their lives. On the 17th, the town was completely enveloped with smoke from the late fires.

Deer Lodge, Montana, 1st, fires are burning in mountains near station.

North Platte, Nebraska, 15th, 16th, 17th: During the fire of the 15th, two men were seriously burned.

Russell, Kansas, 12th, 14th: Causing great damage to young forestry.

San Francisco, 1st: Reports from Portland, Oregon, state that forest fires are raging in surrounding localities, and that much wood and many farm houses have been burned.

Lincoln, Nebraska, 19th: A vast prairie fire is raging in the western part of the state, on the divide or table-land between the Platte and Republican rivers, the fires have proved very disastrous to hay and grass.

Less extensive prairie and forest fires have been reported as follows:

Deadwood, Dakota, 15th, 16th, 17th.
Huron, Dakota, 3d, 4th, 6th, 13th to 17th.
Cheyenne, Wyoming, 5th, 11th.
Fort Assinniboine, Montana, 10th, 12th, 13th, 14th.
Salina, Kansas, 22d.
Fort Union, New Mexico, 30th.
Fort Benton, Montana, 14th.
Helena, Montana, 1st, 3d.
Lewiston, Idaho, 1st.
Spokane Falls, Washington territory, 3d, 5th.
Campo, California, 5th, fires in mountains.
Fort Lapwai, Idaho, 2d, 3d.
Creswell, Kansas, 13th, 17th.

Yates Centre, Kansas, 12th.
Terry's Landing, Montana, 8th, 10th.
Fort Keogh, Montana, 9th, 10th.

DROUGHT.

Nora Springs, Iowa, 30th: The ground is very dry; pasturage suffering for rain, and fall plowing interfered with.

Fort Scott, Kansas, 15th: The ground is becoming very dry; wells and streams are low; late crops are injured, and the ground is too dry for seeding wheat. 30th: The recent rains have revived vegetation; farmers are sowing grain.

Fort Riley, Kansas, 30th: The month has been very dry; the total rainfall for the month has been only 0.64 inch.

Lawrence, Kansas, 18th: The drought which has prevailed for the past seven weeks, during which time less than 0.10 inch of rain fell, was broken by the copious showers of this date. The corn crop has not been seriously damaged.

Holton, Kansas, 30th: The month has been very hot and dry, and the late planted corn and garden vegetables have suffered in consequence. Very little rain has fallen since July.

Creswell, Kansas, 13th: The weather is the dryest that has been experienced at this place during the past eleven years.

Yates Centre, Kansas, 30th: The dry weather of the month has injured the corn crop to some extent in this part of the state.

Dana, Iowa, 30th: Only 0.50 inch of rain has fallen during the past two months.

Westborough, Massachusetts: The drought continued until the 11th; it had prevailed since May 21st, one hundred and fourteen days.

Northfield, Minnesota, 30th: The ground is so dry that no plowing can be done.

Thornville, Michigan, 30th: The lately sowed wheat has not come up well, owing to the dry condition of the soil.

Clear Creek, Nebraska, 15th: The corn crop is drying up. 27th: Rain of this date has ended the drought, which has prevailed for fifty-nine days. The corn crop has been materially injured.

Meadville, Pennsylvania, 17th: The weather is very dry; wells and brooks have dried up, and water is being hauled for domestic purposes.

Fort Benton, Montana, 4th: Many farmers in this vicinity have abandoned their grain crops, the long-continued drought having ruined them.

Leavenworth, Kansas, 13th, weather very hot and dry; rain is badly needed, the late garden vegetables are almost ruined, many persons are compelled to haul water from the river for domestic purposes. 18th, light rain began at 7.55 p. m., which greatly benefited suffering vegetation.

Charleston, Illinois, 14th, very dry and dusty, rain much needed; 29th, rain ends drought.

Guttenburg, Iowa, 30th, the ground is so dry that very little wheat has been sown.

Fort Madison, Iowa, 30th, weather very dry, interfering with the sowing of fall wheat.

MIGRATION OF BIRDS.

Geese flying south: Point Judith, Rhode Island, 28th; Fort Stevenson, Dakota, 25th; Huron, Dakota, 29th, 30th; Alexandria, Dakota, 18th, 21st, 22d; Clear Creek, Nebraska, 19th; Genoa, Nebraska, 9th; Sacramento, California, 6th; Portland, Oregon, 20th, 22d; Umatilla, Oregon, flying northwest, 15th; Tobacco Garden, Dakota, 29th. *Ducks flying south:* Portsmouth, North Carolina, 24th; Olivet, Dakota, 12th; Northfield, Minnesota, 9th; New River Inlet, North Carolina, first appearance of ducks, 28th. *Pelicans flying south:* Keokuk, Iowa, 14th; Clear Creek, Nebraska, 18th. *Cranes flying south:* Tobacco Garden, Dakota, 29th.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR:

W. B. HAZEN,
Brig. & Bvt. Maj. Gen'l,
Chief Signal Officer, U. S. A.

Copy furnished for

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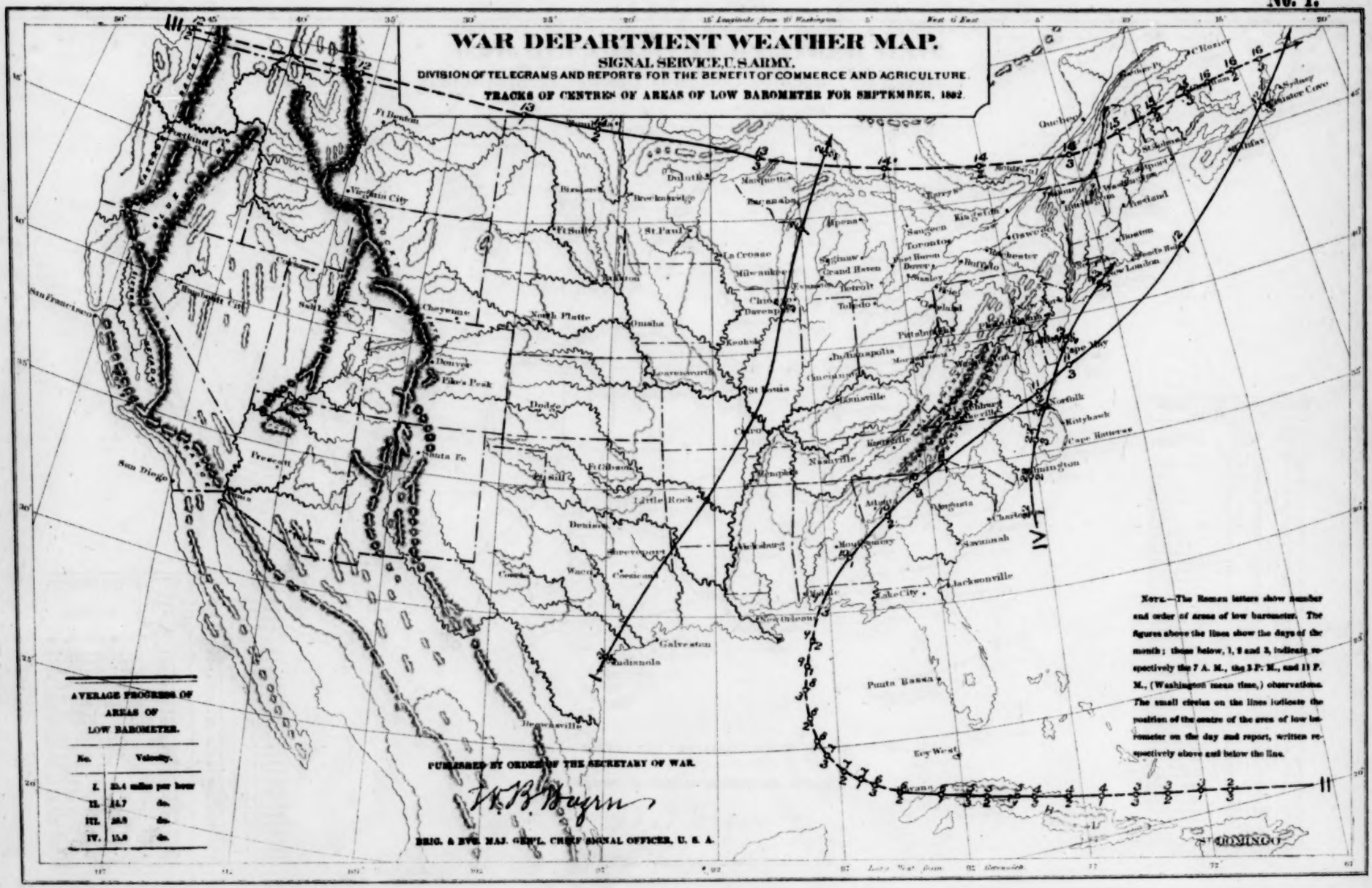
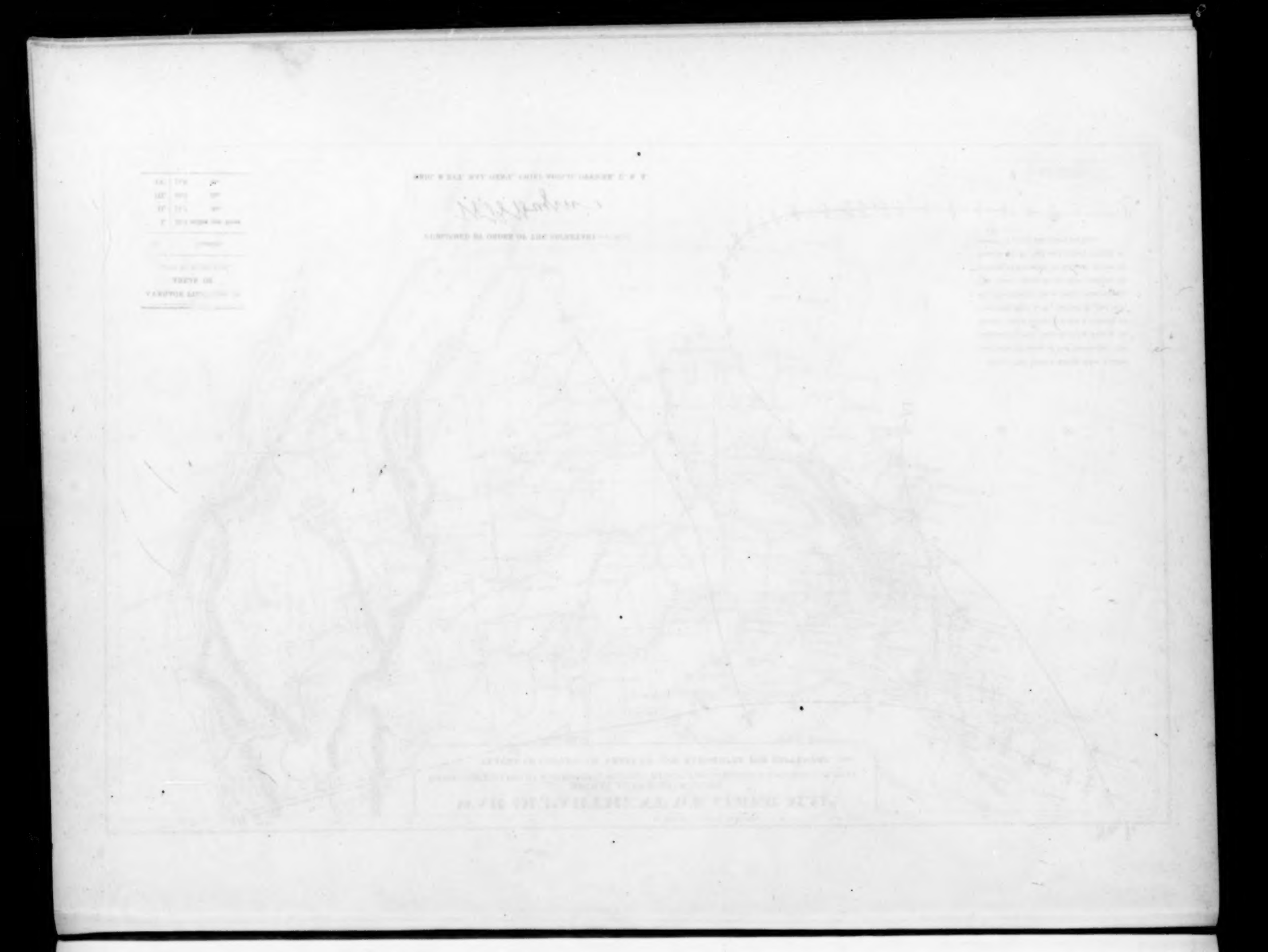
No. I.


WAR DEPARTMENT WEATHER MAP.
SIGNAL SERVICE, U.S. ARMY.
DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.
TRACKS OF CENTRES OF AREAS OF LOW BAROMETER FOR SEPTEMBER, 1882.
AVERAGE PROGRESS OF AREAS OF LOW BAROMETER.
No. Velocity.
I. 23.4 miles per hour
II. 14.7 do.
III. 26.8 do.
IV. 15.0 do.
PUBLISHED BY ORDER OF THE SECRETARY OF WAR.
BRIG. & BVT. MAJ. GEN'L. CHIEF SIGNAL OFFICER, U. S. A.
NOTE.—The Roman letters show number and order of areas of low barometer. The figures above the lines show the days of the month; those below, 1, 2 and 3, indicate respectively the 7 A. M., the 3 P. M., and 11 P. M., (Washington mean time,) observations. The small circles on the lines indicate the position of the centre of the area of low barometer on the day and report, written respectively above and below the line.
St. Domingo



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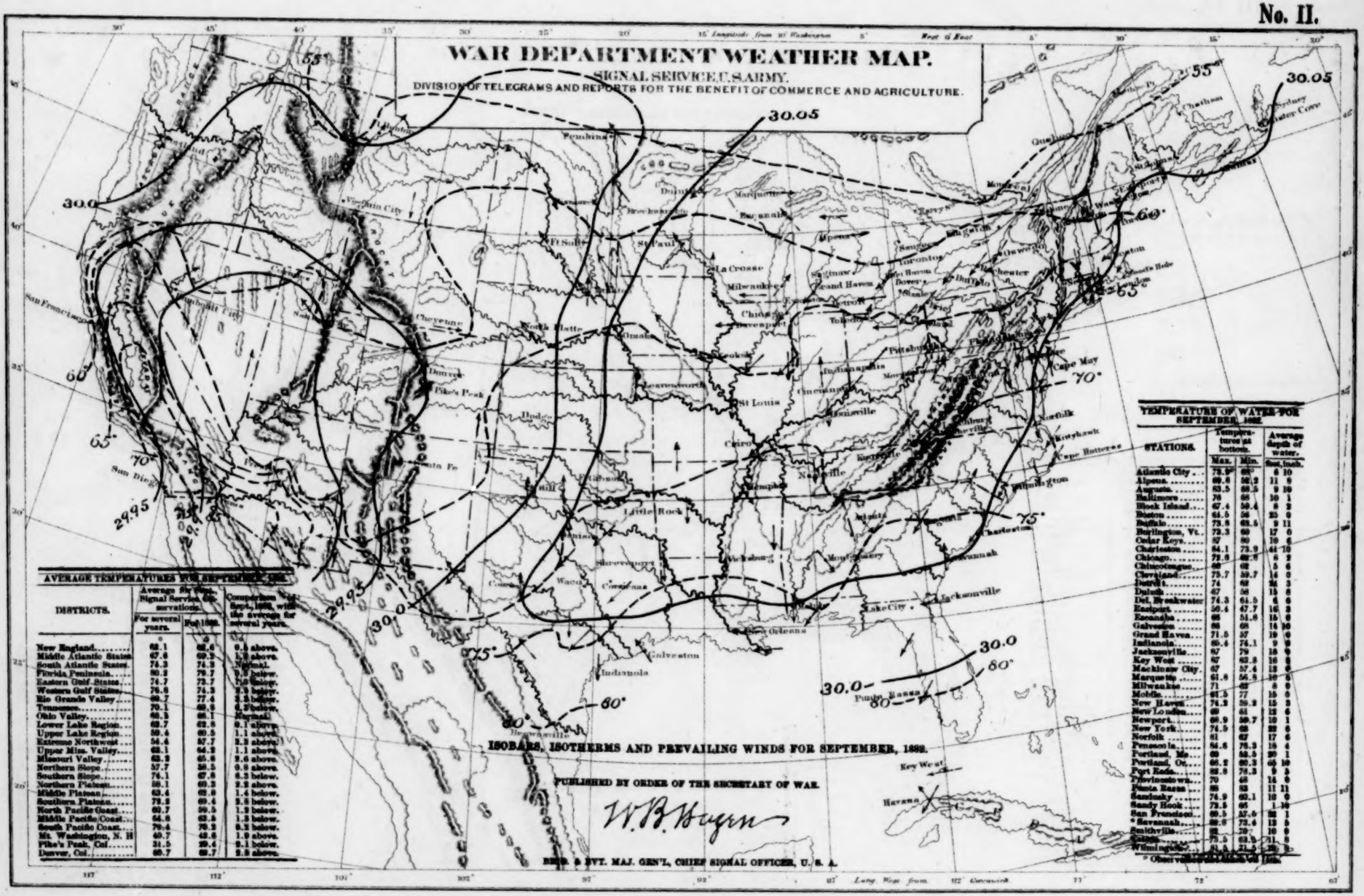


ISOBARS, ISOTHERMS AND PREVAILING WINDS FOR SEPTEMBER, 1882.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

W. B. Hazen

BRIG. & BVT. MAJ. GEN'L, CHIEF SIGNAL OFFICER, U. S. A.

AVERAGE TEMPERATURES FOR SEPTEMBER, 1882.

DISTRICTS.	Average for Sept. Signal Service Observations. For several years.	Average for Sept. Signal Service Observations. For 1882.	Comparison for Sept., 1882, with the average for several years.
	°	°	°
New England	62.1	62.6	0.5 above.
Middle Atlantic States	67.6	69.5	1.9 above.
South Atlantic States	74.3	74.3	Normal.
Florida Peninsula	80.2	79.7	0.5 below.
Eastern Gulf States	74.7	73.7	1.0 below.
Western Gulf States	76.6	74.3	2.3 below.
Rio Grande Valley	80.7	77.4	3.3 below.
Tennessee	70.1	69.9	0.2 below.
Ohio Valley	68.9	68.1	Normal.
Lower Lake Region	69.7	62.6	0.1 above.
Upper Lake Region	59.4	60.5	1.1 above.
Extreme Northwest	54.6	57.7	3.1 above.
Upper Miss. Valley	62.1	64.2	1.1 above.
Missouri Valley	63.2	65.8	2.6 above.
Northern Slope	57.7	58.5	0.8 above.
Southern Slope	74.1	67.8	6.3 below.
Northern Plateau	59.1	60.3	2.2 above.
Middle Plateau	63.4	61.8	1.6 below.
Southern Plateau	73.2	69.4	3.8 below.
North Pacific Coast	60.7	59.5	1.2 below.
Middle Pacific Coast	64.8	63.6	1.2 below.
South Pacific Coast	70.4	70.2	0.2 below.
Mt. Washington, N. H.	40.7	42.6	1.9 above.
Pike's Peak, Col.	31.5	29.4	2.1 below.
Denver, Col.	69.7	69.7	0.0 above.

TEMPERATURE OF WATER FOR SEPTEMBER, 1882.

STATIONS.	Temperatures at bottom. Max.	Temperatures at bottom. Min.	Average depth of water. Feet.	Average depth of water. Inch.
Atlantic City	73.5°	69°	6	10
Alpena	60.6	56.3	11	0
Augusta	63.5	60.3	9	10
Baltimore	70	66	10	1
Block Island	67.4	59.4	8	2
Boston	64.5	56	23	0
Buffalo	73.8	63.5	9	11
Burlington, Vt.	72.3	60	17	0
Cedar Keys	87	80	10	6
Charleston	84.1	73.9	44	10
Chicago	72.6	62.6	6	2
Chincoteague	69	62	5	6
Cleveland	75.7	59.7	14	0
Duluth	74	48	24	3
Del. Breakwater	67	50	11	0
Eastport	74.3	61.5	4	6
Escanaba	60.4	47.7	16	3
Galveston	88	51.6	15	0
Grand Haven	88	68	14	10
Indianola	71.5	57	19	0
Jacksonville	86.4	74.1	9	0
Key West	87	79	18	0
Mackinaw City	87	63.8	10	8
Marquette	67	57.4	13	6
Milwaukee	61.8	56.8	10	6
Mobile	71	67	8	0
New Haven	87.3	77	15	0
New London	74.3	59.3	15	3
Newport	69	61	12	6
New York	68.9	59.7	10	1
Norfolk	74.5	68	22	6
Pensacola	81	67	17	6
Portland, Me.	74.6	70.3	15	6
Port Eads	69	62.5	20	1
Port Huron	66.2	60.3	6	10
Punta Rassa	87.8	78.3	9	3
Provincetown	70	48	14	0
Punta Rassa	86	82	11	11
Sandusky	74.9	63.1	10	0
Sandy Hook	73.5	65	1	10
San Francisco	69.5	57.5	32	1
* Savannah	86.8	73.4	13	6
Smithville	82	70	10	0
Tampa	75.5	68.5	21	0
Wilmington	81.6	71.6	18	0

* Observations discontinued Oct. 1st.

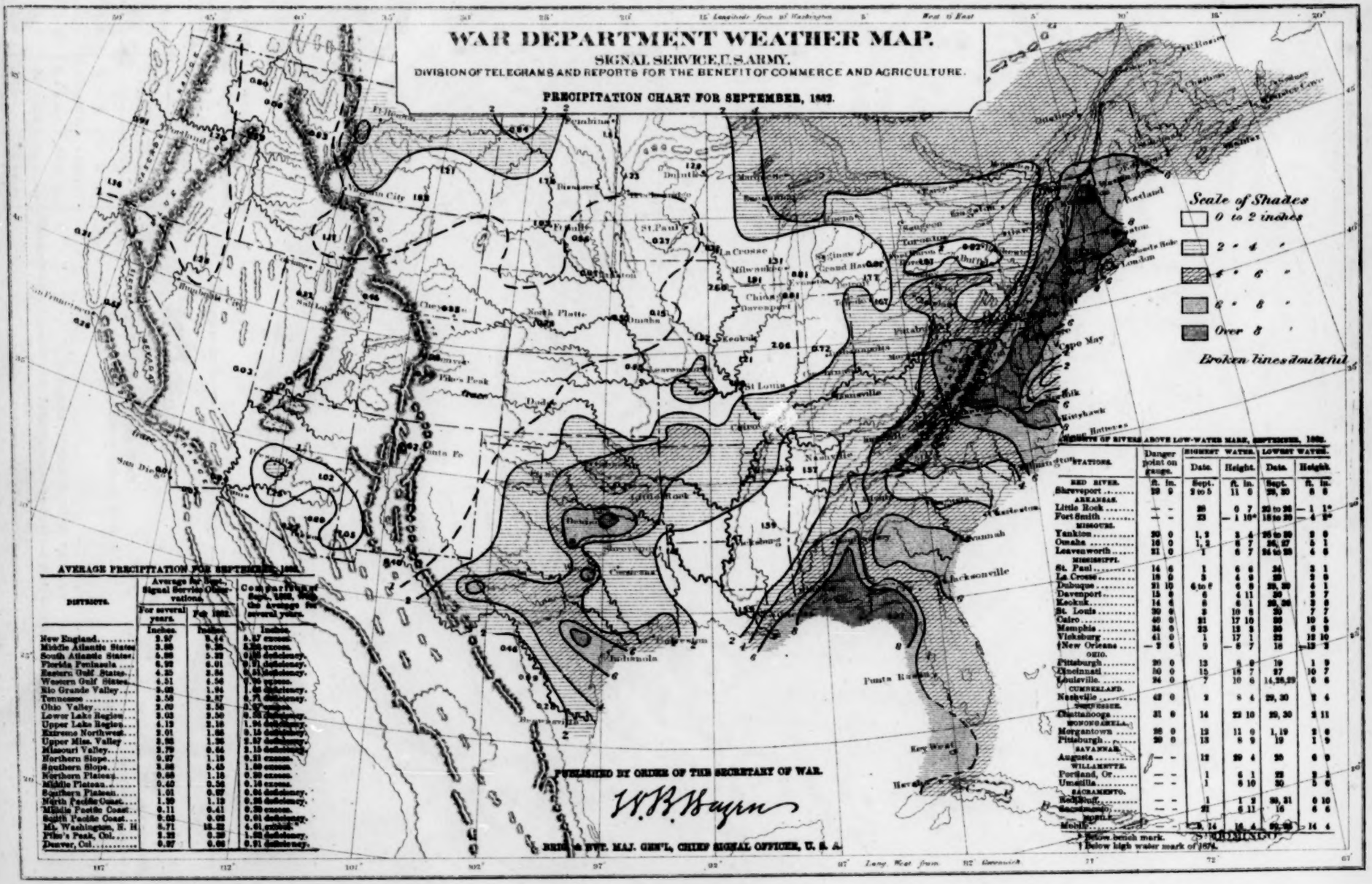
No. III.

WAR DEPARTMENT WEATHER MAP.

SIGNAL SERVICE, U. S. ARMY.

DIVISION OF TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

PRECIPITATION CHART FOR SEPTEMBER, 1882.



AVERAGE PRECIPITATION FOR SEPTEMBER, 1882.

DISTRICTS.	Average for Sept. Signal Service Observations. For several years.	For 1882.	Cent. Par. Sept. 1882, the average for several years.
	Inches.	Inches.	Inches.
New England	3.97	8.44	4.47 excess.
Middle Atlantic States	3.68	9.26	5.58 excess.
South Atlantic States	4.88	5.29	0.41 deficiency.
Florida Peninsula	6.92	6.01	0.91 deficiency.
Eastern Gulf States	4.25	3.84	0.41 deficiency.
Western Gulf States	4.51	4.56	0.05 excess.
Rio Grande Valley	2.08	1.04	1.04 deficiency.
Tennessee	3.58	3.57	0.01 deficiency.
Ohio Valley	2.69	2.56	0.13 excess.
Lower Lake Region	3.03	3.50	0.47 excess.
Upper Lake Region	4.13	2.19	1.94 deficiency.
Extreme Northwest	2.01	1.08	0.13 deficiency.
Upper Miss. Valley	3.82	1.25	2.57 deficiency.
Missouri Valley	3.79	0.64	3.15 deficiency.
Northern Slope	0.97	1.18	0.21 excess.
Southern Slope	3.68	5.45	1.69 excess.
Northern Plateau	0.68	1.18	0.50 excess.
Middle Plateau	0.49	0.58	0.19 excess.
Southern Plateau	1.51	0.97	0.54 deficiency.
North Pacific Coast	1.39	1.12	0.27 deficiency.
Middle Pacific Coast	0.11	0.41	0.30 excess.
South Pacific Coast	0.03	0.02	0.01 deficiency.
Mt. Washington, N. H.	6.71	12.32	5.61 excess.
Pike's Peak, Col.	1.38	0.39	1.00 deficiency.
Denver, Col.	0.97	0.06	0.91 deficiency.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

W. B. Hazen

BRIG. GEN. AND BVT. MAJ. GEN'L, CHIEF SIGNAL OFFICER, U. S. A.

HEIGHTS OF RIVERS ABOVE LOW-WATER MARK, SEPTEMBER, 1882.

STATIONS.	Danger point on gauge.	HIGHEST WATER. Date.	HIGHEST WATER. Height.	LOWEST WATER. Date.	LOWEST WATER. Height.
	ft. in.	Sept.	ft. in.	Sept.	ft. in.
RED RIVER.					
Shreveport	20 0	2 to 5	11 0	29, 30	8 0
ARKANSAS.					
Little Rock	— —	26	0 7	25 to 28	— 1 1*
Fort Smith	— —	23	— 1 10*	15 to 20	— 4 1*
MISSOURI.					
Yankton	20 0	1, 2	3 4	25 to 29	2 0
Omaha	16 0	1, 2	8 7	26, 27	5 1
Leavenworth	21 0	1	6 7	24 to 28	4 1
MISSISSIPPI.					
St. Paul	14 6	1	6 6	24	2 1
La Crosse	18 6	1	4 6	29	1 9
Dubuque	21 10	6 to 9	6 6	25, 26	4 1
Davenport	15 6	6	4 11	26	1 7
Keokuk	14 6	6	6 1	25, 26	3 7
St. Louis	30 0	8	10 6	30	7 7
Cairo	40 0	21	17 10	29	10 5
Memphis	34 0	23	15 9	29	9 9
Vicksburg	41 0	1	17 1	29	12 10
†New Orleans	— 2 6	9	— 6 7	18	—13 2
OHIO.					
Pittsburgh	20 0	13	8 0	19	1 9
Cincinnati	50 0	15	15 7	27	10 7
Louisville	24 0	7	10 6	14, 28, 29	6 6
CUMBERLAND.					
Nashville	42 0	2	8 4	29, 30	2 4
TENNESSEE.					
Chattanooga	31 0	14	22 10	29, 30	2 11
MONONGAHELA.					
Morgantown	20 0	13	11 0	1, 19	2 6
Pittsburgh	30 0	13	6 9	19	1 9
SAVANNAH.					
Augusta	— —	12	29 4	29	6 9
WILLAMETTE.					
Portland, Or	— —	1	6 1	22	2 1
Umatilla	— —	1	8 10	30	5 6
SACRAMENTO.					
Red Bluff	— —	1	1 3	28, 31	0 10
Sacramento	— —	21	6 11	16	4 6
MOBILE.					
Mobile	— —	3, 14	14 4	29, 30	14 4

* Below bench mark. † Below high water mark of 1874.

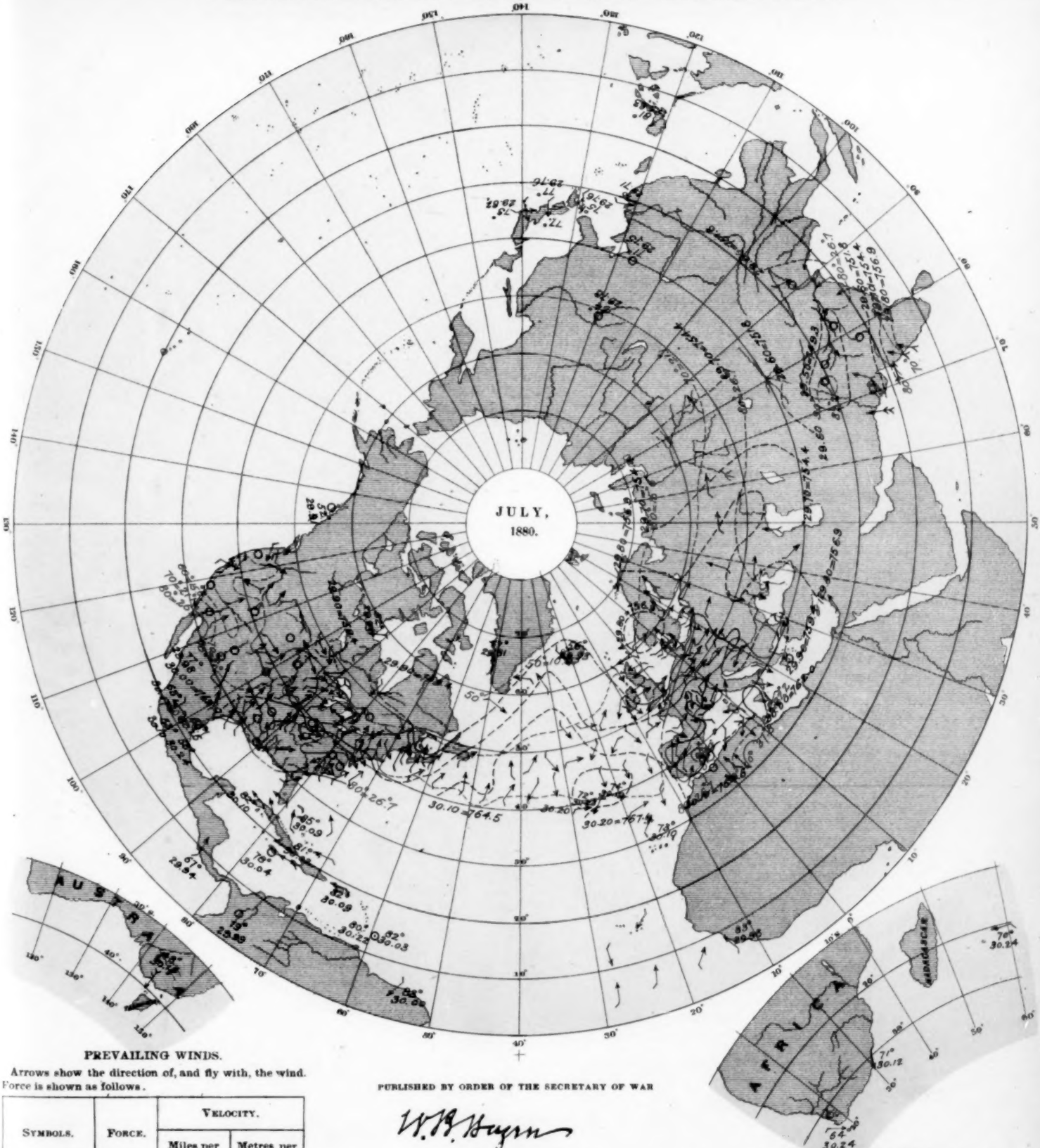
SIGNAL SERVICE.

Office of the Chief Signal Officer,

UNITED STATES ARMY.

Charted from Actual Observations taken Simultaneously, Series commencing January, 1877.

No. V.



PREVAILING WINDS.

Arrows show the direction of, and fly with, the wind. Force is shown as follows.

Symbols.	Force.	Velocity.	
		Miles per hour.	Metres per second.
O	0	0	0
→	1, 2	0 to 9	0 to 4.0
→	3, 4	9.1 to 22.5	4.1 to 10.1
→	5, 6	22.6 to 40.5	10.1 to 18.1
→	7, 8	40.6 to 67.5	18.1 to 30.2
→	9, 10	67.6 up.	30.2 & over.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR

W. B. Hazen

Brig. & Bvt. Maj. Gen'l,
Chief Signal Officer, U. S. A.

ISOBARS AND ISOTHERMS.

Isobars in *blue*; detached barometer means in English inches.

Isotherms in *red*; detached temperature means in degrees Fahrenheit.

Broken lines, are doubtful.

INTERNATIONAL MONTHLY CHART.

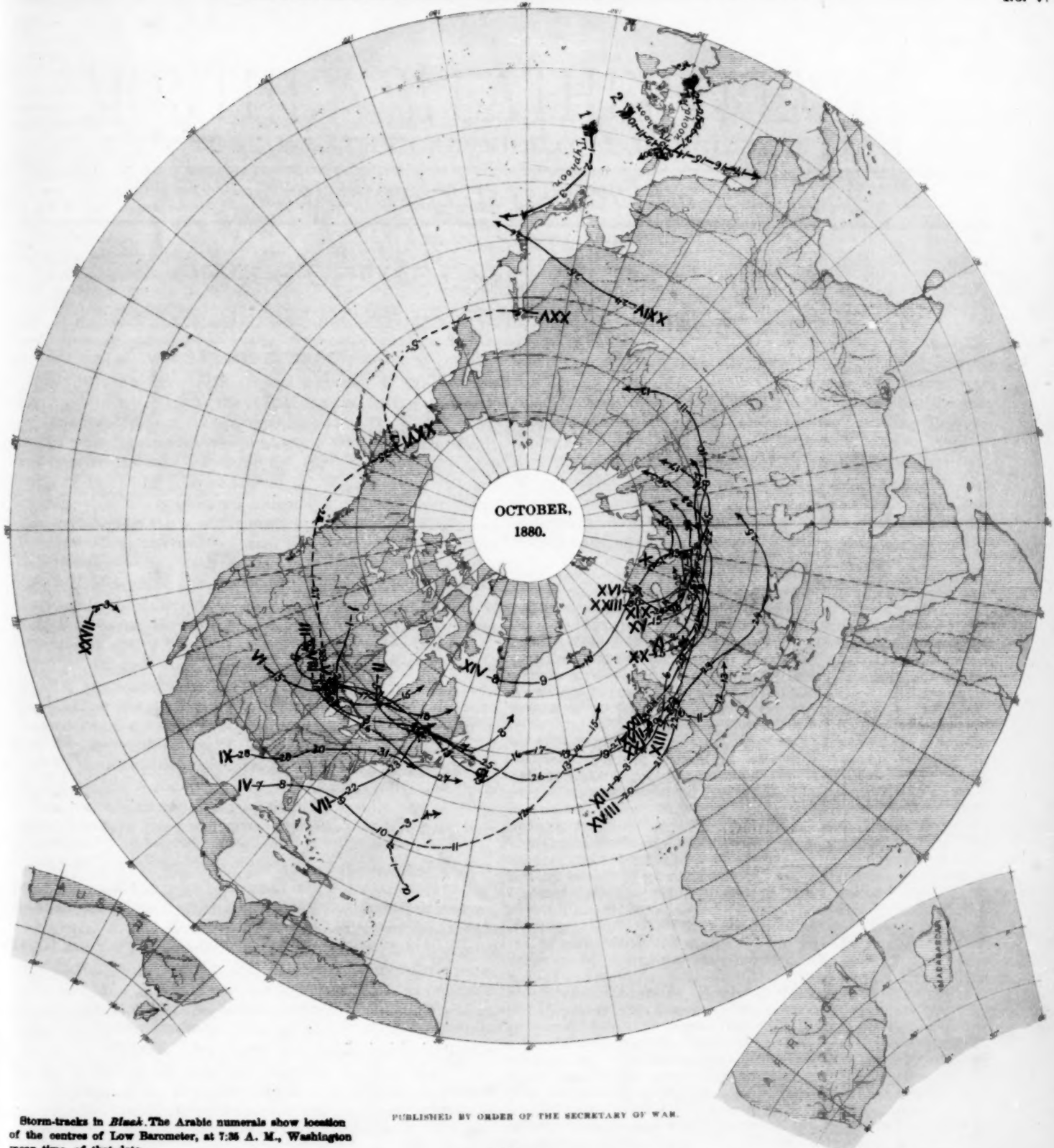
Showing mean pressure, mean temperature, mean force and prevailing direction of winds at 7:35 A. M. Washington mean time, for the month of July, 1880, based on the daily charts of the International Bulletin.

Office of the Chief Signal Officer,

UNITED STATES ARMY.

Charted from Actual Observations taken Simultaneously, Series commencing November, 1877.

No. V.



Storm-tracks in *Black*. The Arabic numerals show location of the centres of Low Barometer, at 7:35 A. M., Washington mean time, of that date.

Broken or dotted lines, are doubtful.

PUBLISHED BY ORDER OF THE SECRETARY OF WAR.

W. B. Hazen

BRIG. & BVT. MAJ. GEN'L.
CHIEF SIGNAL OFFICER, U. S. A.

INTERNATIONAL CHART.

Showing Tracks of Centres of Low Barometer for October, 1880.